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Primary Production on the Labrador Shelf and in the Strait of Belle Isle in May 1988

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Canadian Data Report of Fisheries and Aquatic Sciences No. 784

Fisheries and Oceans Pêches et Océans

Canada

Canadian Data Report of Fisheries and Aquatic Sciences

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ABSTRACT

B. Irwin, J. Anning, C. Caverhill and T. Platt. 1990. Primary production on the Labrador Shelf and in the Strait of Belle Isle in May 1988. Can. Data Rep. Fish. Aquat. Sci. No. 784: iv + 96 p.

During the period 7 May to 17 May 1988, a series of primary productivity experiments were conducted on board CSS Hudson on the Labrador Shelf and in the Strait of Belle Isle. In this report we make available the raw data and also the fitted light saturation parameters.

RESUME

B. Irwin, J. Anning, C. Caverhill and T. Platt. 1990. Primary production on the Labrador Shelf and in the Strait of Belle Isle in May 1988. Can. Data Rep. Fish. Aquat. Sci. No. 784: iv + 96 p.

Pendant la période du 7 mai au 17 mai 1988, une série d'expériences de productivité a été effectuée à bord du CSS Hudson, sur le plateau du Labrador et dans le détroit de Belle Isle. Dans ce rapport nous présentons les données brutes sur ces expériences, ainsi que les paramètres qui furent calculées pour representer les courbes de production en fonction de la lumière.

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INTRODUCTION

This is the fifteenth in a series of data reports giving results of experiments on photosynthetic production versus light intensity for natural phytoplankton populations in the North Atlantic and adjacent waters north of 50°N. Samples were collected from CSS Hudson between 7 May and 17 May 1988 on the Labrador Shelf NE of Newfoundland and in the Strait of Belle Isle.

This was an international multi-discipline cruise on CSS Hudson coordinated by the Biological Oceanography Division of the Biological Sciences Branch at the Bedford Institute of Oceanography. Other laboratories represented on the cruise were the Institute of Ocean Sciences, Sidney, B.C., GKSS Forschungszentrum, FRG, Institut fuer Allgemeine Botanik, FRG, Institut fur Meereskund, FRG, University of Oldenburg, FRG, University of Tokyo, Japan and Dalhousie University, Canada.

SAMPLING

Water samples for *in situ* primary productivity experiments were collected with 12 *l* Niskin bottles at approximately 1000 hrs local time. Sampling depths were 1, 5, 10, 15, 20, 25, 30, 40, 50, 75 and 100 m.

Detailed chlorophyll profiles were collected from a modified continuous pump sampler (Herman et al. 1984) fitted with a Guildline model 8109 CTD and an Aquatracka® submersible fluorometer. Samples were collected every 5 or 10 meters from 110 m to the surface. Samples for PI experiments were also collected from the pump.

METHODS

In situ Productivity

The ^{14}C method by Strickland and Parsons (1972) was used. 20 µci of sodium bicarbonate ^{14}C was added to each of 6 light and 3 dark bottles from each depth. Light bottles were deployed at sampled depths at noon and recovered at sunset. Dark bottles were kept in a darkened cooler at *in situ* temperatures. All samples were filtered after recovery of the *in situ* wire.

PI Experiments

20 µci of sodium bicarbonate ^{14}C was added to each of 42 light and 2 dark bottles for each experiment. Bottles were incubated in temperature controlled incubators illuminated by 250 w tungsten halogen lamps. All incubations were of three hours duration. All samples were filtered onto Whatman GF/F filters.

Chlorophyll

Replicate 100 mls of sample were filtered onto 25 mm Whatman GF/F filters. Chlorophyll was extracted for 24 hours with 85% acetone at 0°C in the dark. The fluorometric technique of Yentsch and Menzel (1963) as modified by Holm-Hansen et al. (1965) was used to estimate chlorophyll concentrations.

Organic Particulates

Samples for particulate organic carbon and organic nitrogen were filtered onto precombusted 25 mm Whatman GF/F filters. Filters were analysed by combustion in a Perkin Elmer Model 210 CHN analyser.

Nutrients

Samples for nitrate, silicate and inorganic phosphate were collected from most sampled depths. Samples were analysed immediately after collection using a Technicon II Autoanalyser. Nitrate was measured using industrial method 158-71W, silicate with method 186-72W and phosphate with method 155-71W.

Incubation and Incident Light

Photosynthetically Active Radiation (P.A.R.) was measured at each bottle position in the incubators with a Biospherical Instruments 4π quantum meter (Model Q.S.L. 100).

Estimation of Photosynthetic Parameters

Measurement of specific production P^B and irradiance I were used to estimate parameters in the equation of Platt et al. (1981),

$$P^B = P_S (1 - e^{-\alpha I/Ps}) e^{-\beta I/Ps}$$

P_s (mg C mg Chl^{-1} h^{-1}) is the light saturated rate of photosynthesis in the absence of photoinhibition, α (mg C (mg Chl)$^{-1}$ h^{-1} w^{-1} m^{-2}) is the initial slope of the PI curve and β (same units as α) is a parameter that characterises photoinhibition. Complete details of the fitting routine are given in Irwin et al. (1982) and a discussion of the mathematical basis for this technique is given in Irwin et al. (1980).

ACKNOWLEDGEMENTS

We wish to thank Al Macdonald and Mark Hodgson for their assistance in the analysis of samples and the preparation of data for this report.

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LOCATION OF SAMPLING STATIONS

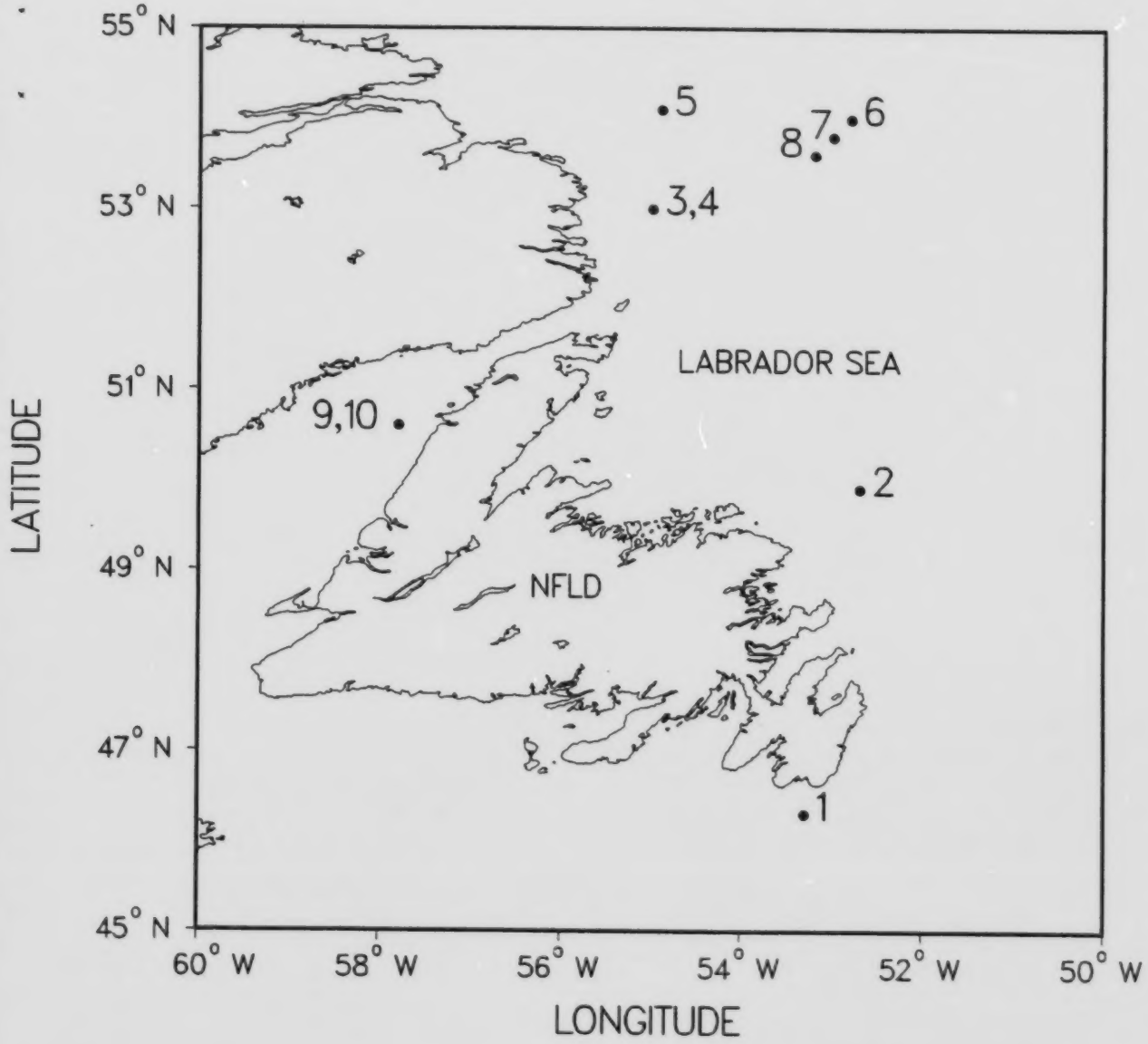


Fig. 1 Location of sampling stations.

IN SITU AND PUMP PROFILES

UNITS

Z	=	depth in meters
P	=	primary production mg C m^{-3} h^{-1}
NO_3	=	nitrate concentration mg at m^{-3}
SiO_3	=	silicate concentration mg at m^{-3}
PO_4	=	phosphate concentration mg at m^{-3}
Chl	=	chlorophyll concentration mg m^{-3}
POC	=	particulate organic carbon mg m^{-3}
PON	=	particulate organic nitrogen mg m^{-3}

LABRADOR SEA 1988

STATION NO. 1

LAT 46°18.20' N LONG 53°18.40' W DATE 07/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	-	9.36	.60	.05	.36	-	-
5	-	8.60	.54	.05	.33	469	54
10	-	9.54	.47	.04	.35	-	-
15	-	8.95	.40	.11	.37	-	-
20	-	8.08	.35	.19	.36	421	46
25	-	8.19	.16	.24	.39	-	-
30	-	8.13	.09	.43	.39	-	-
35	-	9.42	.13	.36	.40	-	-
40	-	7.49	1.23	.99	.50	-	-
45	-	8.31	.28	.42	.42	-	-
50	-	8.25	.23	.38	.42	289	46
55	-	8.13	.45	.39	.43	-	-
60	-	8.08	.45	.41	.44	-	-
65	-	7.72	.49	.43	.45	-	-
70	-	7.90	.71	.45	.46	-	-
75	-	8.48	.54	.46	.46	-	-
80	-	8.78	.85	.65	.55	-	-
85	-	7.72	2.27	1.98	.60	-	-
90	-	5.91	3.64	2.84	.69	-	-
95	-	6.38	3.81	3.10	.75	-	-
100	-	5.97	5.33	4.80	.80	-	-
105	-	5.38	5.71	5.06	.81	-	-
108	-	5.56	5.85	5.13	.92	-	-

LABRADOR SEA 1988

STATION NO. 2

LAT 49°54.10' N LONG 52°40.70' W DATE 08/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	-	9.39	.00	.48	.20	823	66
5	-	8.54	.00	.35	.21	-	-
10	-	11.10	.00	.21	.23	-	-
15	-	18.61	-	2.55	.44	571	102
20	-	9.01	4.11	5.77	.70	-	-
25	-	1.02	7.77	8.69	.92	-	-
30	-	.74	8.12	8.84	.94	-	-
35	-	.76	7.90	8.43	.92	-	-
40	-	.71	8.06	8.72	.94	109	12
45	-	1.09	6.86	7.48	.80	-	-
50	-	1.77	7.01	7.49	.79	-	-
55	-	1.64	7.00	7.08	.80	-	-
60	-	1.68	7.60	7.50	.85	-	-
65	-	1.23	7.87	7.92	.85	-	-
70	-	.88	8.07	7.50	.85	-	-
75	-	.48	8.34	7.92	.87	-	-
80	-	.32	8.42	8.33	.89	-	-
85	-	.20	8.75	8.75	.90	-	-
90	-	.23	8.92	8.75	.91	-	-
95	-	.17	9.16	9.58	.98	-	-
100	-	.17	9.26	9.58	.94	-	-
105	-	.20	9.43	9.58	.93	-	-
110	-	.12	9.41	9.58	.95	-	-

LABRADOR SEA 1988

STATION NO. 3

LAT 53° .20' N LONG 54°59.20' W DATE 09/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	17.279	11.10	.37	2.53	.34	705	86
5	12.659	11.10	.35	2.54	.36	784	94
10	4.399	12.47	.34	2.55	.32	769	96
15	1.269	9.90	.32	2.56	.38	732	91
20	.217	11.61	.31	2.58	.43	683	88
25	.344	11.10	.29	2.59	.34	726	90
30	.159	10.76	.41	2.94	.39	705	96
40	.057	3.51	3.51	6.74	.66	131	28
50	.020	.91	7.42	8.41	.84	178	18
75	-	6.03	4.37	6.16	.69	-	-
100	.005	.25	9.01	9.47	.91	187	17

LABRADOR SEA 1988

STATION NO. 3

LAT 53° 1.10' N LONG 55° .70' W DATE 09/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	-	10.25	.10	2.54	.31	656	82
5	-	11.27	.13	2.53	.33	619	82
10	-	11.10	.05	2.48	.31	645	86
15	-	11.27	.12	2.45	.33	-	-
20	-	8.37	1.44	3.65	.48	-	-
25	-	9.22	.56	2.81	.38	-	-
30	-	7.17	2.00	4.42	.51	-	-
35	-	1.21	6.78	8.15	.79	-	-
40	-	1.04	7.49	8.47	.82	-	-
45	-	.41	8.63	8.96	.89	-	-
50	-	.25	8.98	9.23	.92	-	-
55	-	.24	9.07	9.29	.91	-	-
60	-	.37	9.01	9.29	.90	-	-
65	-	.21	8.95	9.29	.90	-	-
70	-	.24	8.86	9.07	.89	-	-
75	-	.31	8.97	9.09	.90	-	-
80	-	.20	8.88	9.19	.90	-	-
85	-	.24	9.10	9.38	.90	-	-
90	-	.37	9.08	9.39	.90	-	-
95	-	.21	9.13	9.41	.90	-	-
100	-	.27	9.11	9.46	.88	-	-
105	-	.20	9.09	9.35	.86	-	-

LABRADOR SEA 1988

STATION NO. 4

LAT 52°57.40' N LONG 54°59.30' W DATE 10/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	11.886	9.22	.06	2.12	.37	770	92
5	14.916	11.27	.00	2.10	.32	775	92
10	12.014	10.93	.03	2.09	.31	721	86
15	5.437	10.08	.23	2.08	.31	668	81
20	1.733	11.95	.07	2.11	.30	1090	185
25	.677	11.10	.01	2.06	.33	683	82
30	.180	6.06	2.26	5.77	.57	285	44
40	.066	2.11	5.85	7.98	.80	144	16
50	.044	.96	7.20	8.69	.89	92	10
75	.019	.55	8.30	8.89	.93	101	11
100	.006	.22	8.43	9.41	.97	98	10

LABRADOR SEA 1988

STATION NO. 4

LAT 52°58.70' N LONG 54°59.30' W DATE 10/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	-	10.93	.00	2.10	.34	-	-
5	-	10.76	.00	2.10	.33	-	-
10	-	10.76	.00	2.11	.32	-	-
15	-	8.72	1.17	4.37	.53	254	57
20	-	7.90	1.32	4.62	.56	273	59
25	-	7.90	1.76	5.04	.56	228	48
30	-	5.32	3.30	6.30	.65	-	-
35	-	2.34	5.09	7.56	.75	-	-
40	-	1.09	6.63	8.40	.83	-	-
45	-	.77	7.47	8.82	.89	-	-
50	-	.60	7.67	9.07	.88	-	-
55	-	.75	7.69	9.07	.88	-	-
60	-	.60	7.81	9.07	.89	-	-
65	-	.49	8.17	9.15	.90	-	-
70	-	.43	8.29	9.24	.91	-	-
75	-	.54	8.52	9.23	.91	-	-
80	-	.41	8.55	9.22	.92	-	-
85	-	.35	8.50	9.21	.92	-	-
90	-	.33	8.48	9.20	.91	-	-
95	-	.47	8.52	9.20	.91	-	-
100	-	.44	8.73	8.91	.88	-	-
105	-	.29	8.81	9.26	.91	-	-
110	-	.36	8.78	9.18	.90	-	-

LABRADOR SEA 1988

STATION NO. 5

LAT 54° 3.90' N LONG 54°55.90' W DATE 11/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	11.836	9.22	-	5.87	.43	624	90
5	11.262	9.22	.26	5.93	.60	632	96
10	5.693	9.05	-	5.89	.41	611	94
15	1.718	9.22	-	5.90	.44	583	79
20	.835	7.86	.85	5.41	.45	482	83
25	.286	6.55	-	5.90	.52	345	59
30	.135	4.62	3.32	6.98	.64	285	47
40	.023	1.63	5.72	8.41	.75	147	18
50	.018	1.20	7.52	8.77	.87	128	14
75	.007	.43	9.08	8.82	.88	86	10
100	.002	.18	9.58	8.62	.89	94	8

LABRADOR SEA 1988

STATION NO. 5

LAT 54° 4.00' N LONG 54°54.50' W DATE 11/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	-	11.10	.12	5.15	.37	608	97
5	-	11.44	.15	5.17	.38	-	-
10	-	9.39	.18	5.11	.41	519	86
15	-	9.39	.21	4.98	.44	-	-
20	-	10.76	.28	5.26	.41	462	78
25	-	8.31	.59	5.68	.46	-	-
30	-	1.77	5.61	8.17	.77	-	-
35	-	1.18	6.03	8.60	.81	-	-
40	-	.77	6.37	8.77	.83	-	-
45	-	.91	6.37	8.62	.79	-	-
50	-	1.16	6.73	8.30	.82	-	-
55	-	.61	8.26	8.62	.86	-	-
60	-	.38	8.83	9.03	.88	-	-
65	-	.21	9.01	9.02	.87	-	-
70	-	.21	9.13	9.01	.87	-	-
75	-	.15	9.22	9.01	.87	-	-
80	-	.12	9.34	8.80	.88	-	-
85	-	.09	9.51	8.94	.88	-	-
90	-	.15	9.49	8.58	.87	-	-
95	-	.23	9.60	8.22	.86	-	-
100	-	.18	9.65	8.17	.85	-	-
105	-	.14	9.63	8.17	.85	-	-
110	-	.28	9.72	8.12	.85	-	-

LABRADOR SEA 1988

STATION NO. 6

LAT 53°57.10' N LONG 52°45.80' W DATE 12/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	32.645	14.69	.00	5.21	.30	777	100
5	25.228	10.50	.10	5.21	.31	899	139
10	11.607	16.91	.42	5.20	.31	994	158
15	2.009	12.81	2.49	3.53	.49	470	84
20	1.500	6.67	4.33	4.79	.55	270	48
25	.510	6.96	4.77	4.58	.57	297	56
30	.339	7.08	6.16	5.28	.62	287	50
40	.043	1.21	10.85	7.96	.85	119	14
50	.016	.42	12.08	8.27	.88	68	5
75	.007	.41	12.91	8.30	.87	74	5
100	.012	.25	13.41	8.35	.90	80	6

LABRADOR SEA 1988

STATION NO. 6

LAT 53°51.90' N LONG 52°44.20' W DATE 12/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	-	16.91	.00	.95	.23	932	108
5	-	19.64	.00	.92	.27	813	113
10	-	13.49	1.91	3.56	.44	375	80
15	-	10.76	2.97	4.19	.49	-	-
20	-	9.90	3.43	4.10	.51	-	-
25	-	6.66	3.50	4.07	.50	-	-
30	-	6.66	4.74	4.87	.57	-	-
35	-	1.23	10.31	7.91	.80	-	-
40	-	2.19	9.46	7.46	.76	-	-
45	-	1.11	10.82	7.97	.83	-	-
50	-	.25	12.11	8.43	.85	-	-
55	-	.37	12.06	8.46	.85	-	-
60	-	.33	12.00	8.24	.85	-	-
65	-	.27	12.35	8.27	.86	-	-
70	-	.12	12.77	8.30	.86	-	-
75	-	.12	12.64	8.38	.85	-	-
80	-	.18	12.91	8.63	.88	-	-
85	-	.35	13.06	8.35	.88	-	-
90	-	.46	13.21	8.36	.88	-	-
95	-	.12	13.16	8.14	.87	-	-
100	-	.24	13.51	8.28	.89	-	-
105	-	.29	13.46	8.23	.87	-	-

LABRADOR SEA 1988

STATION NO. 7

LAT 53°45.80' N LONG 53° 4.70' W DATE 13/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	24.497	9.48	.28	.58	-	884	90
5	15.253	11.01	.30	.40	-	801	84
10	5.666	11.01	.20	.30	-	1006	115
15	1.739	22.29	.26	.20	-	962	126
20	1.106	23.57	.51	.24	-	727	116
25	.008	21.77	.45	.28	-	586	110
30	.253	13.66	2.70	3.19	-	424	84
40	.053	4.80	5.85	6.18	-	185	32
50	.021	1.48	8.28	7.91	-	124	14
75	.003	.45	10.00	8.40	-	100	10
100	.000	.27	10.87	8.54	-	115	6

LABRADOR SEA 1988

STATION NO. 7

LAT 53°45.90' N LONG 53° 1.70' W DATE 13/03/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	-	14.34	.12	.47	-	866	96
5	-	22.20	.22	.32	-	901	114
10	-	21.86	.35	.09	-	798	123
15	-	13.83	3.60	5.62	-	-	-
20	-	7.72	4.34	5.86	-	-	-
25	-	5.85	4.39	5.64	-	-	-
30	-	6.79	4.03	5.33	-	-	-
35	-	8.54	3.57	4.33	-	-	-
40	-	8.02	5.30	5.57	-	-	-
45	-	2.81	7.64	8.07	-	-	-
50	-	1.41	8.75	8.47	-	-	-
55	-	.93	9.15	8.76	-	-	-
60	-	2.93	7.87	7.18	-	-	-
65	-	3.51	7.76	7.02	-	-	-
70	-	1.79	9.26	7.61	-	-	-
75	-	1.05	10.33	8.03	-	-	-
80	-	.84	10.37	8.03	-	-	-
85	-	.19	10.74	8.45	-	-	-
90	-	.18	10.77	8.46	-	-	-
95	-	.45	10.87	8.23	-	-	-
100	-	.17	11.03	8.46	-	-	-
105	-	.19	10.89	8.45	-	-	-
110	-	.24	10.89	8.20	-	-	-

LABRADOR SEA 1988

STATION NO. 8

LAT 53°34.60' N LONG 53°10.00' W DATE 14/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	17.102	8.88	.21	.24	-	735	59
5	22.916	12.30	.20	.25	-	1046	90
10	19.816	23.40	.20	.24	-	1115	124
15	5.051	29.97	.20	.17	-	1243	154
20	1.264	31.23	.25	.18	-	1502	224
25	.709	24.59	.44	.44	-	641	114
30	.569	18.10	1.76	1.97	-	470	96
40	.012	1.98	8.12	8.90	-	119	16
50	.035	1.31	7.91	8.61	-	126	14
75	.040	1.50	10.02	8.79	-	100	12
100	.023	.19	11.36	8.81	-	97	6

LABRADOR SEA 1988

STATION NO. 8

LAT 53°34.30' N LONG 53°10.50' W DATE 14/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	-	9.56	.15	.18	-	-	-
5	-	18.96	.01	.31	-	-	-
10	-	24.76	.13	.28	-	-	-
15	-	25.27	.20	.25	-	643	122
20	-	13.06	.53	.55	-	439	99
25	-	10.76	2.34	3.03	-	352	102
30	-	8.54	2.76	3.27	-	-	-
35	-	9.64	3.38	3.86	-	-	-
40	-	8.43	4.59	5.21	-	-	-
45	-	.88	8.79	9.70	-	-	-
50	-	.48	8.98	9.02	-	-	-
55	-	.79	8.73	8.91	-	-	-
60	-	2.55	6.49	7.21	-	-	-
65	-	1.48	9.12	8.61	-	-	-
70	-	.68	10.28	8.90	-	-	-
75	-	.93	10.03	8.56	-	-	-
80	-	1.09	10.15	8.22	-	-	-
85	-	.51	10.71	8.56	-	-	-
90	-	.68	10.90	8.48	-	-	-
95	-	.41	11.17	8.60	-	-	-
100	-	.29	11.45	8.86	-	-	-
105	-	.23	11.67	8.84	-	-	-
110	-	1.10	11.55	8.83	-	-	-

LABRADOR SEA 1988

STATION NO. 9

LAT 50°33.40' N LONG 57°50.10' W DATE 16/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	1.389	1.32	.00	.42	-	332	32
5	2.273	2.01	.00	.46	-	384	38
10	1.087	1.47	.00	.49	-	321	30
15	.891	1.38	.00	.52	-	281	32
20	.859	1.70	.00	.55	-	317	38
25	.913	3.98	.00	.91	-	475	56
30	1.145	12.64	.29	3.01	-	529	64
40	.133	2.63	5.41	5.45	-	216	22
50	.058	.61	5.53	6.25	-	115	10
75	.021	.34	7.71	8.69	-	90	10
100	.003	.18	7.27	8.66	-	68	8

LABRADOR SEA 1988

STATION NO. 9

LAT 50°34.00' N LONG 57°49.50' W DATE 16/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	-	1.79	.16	.00	-	261	37
5	-	1.71	.19	.00	-	-	-
10	-	3.74	.18	.38	-	334	42
15	-	8.37	.11	.56	-	-	-
20	-	13.32	.17	.98	-	574	78
25	-	7.43	1.35	1.40	-	-	-
30	-	5.79	1.76	2.23	-	-	-
35	-	3.07	2.60	3.06	-	-	-
40	-	3.34	4.23	4.73	-	-	-
45	-	1.59	5.11	5.53	-	-	-
50	-	1.41	5.73	6.36	-	-	-
55	-	.83	6.57	6.77	-	-	-
60	-	.62	6.90	7.18	-	-	-
65	-	.34	7.59	7.73	-	-	-
70	-	.25	7.93	8.00	-	-	-
75	-	.22	8.28	8.69	-	-	-
80	-	.23	8.02	8.34	-	-	-
85	-	.23	7.93	7.90	-	-	-
90	-	.17	7.84	8.01	-	-	-
95	-	.22	7.75	8.26	-	-	-
100	-	.21	7.87	8.47	-	-	-
105	-	.22	7.91	8.20	-	-	-
108	-	.41	8.37	8.63	-	-	-

LABRADOR SEA 1988

STATION NO. 10

LAT 50°34.60' N LONG 57°48.00' W DATE 17/05/88

Z	P	CHL	NO3	SIO3	PO4	POC	PON
1	-	1.09	.12	.00	-	-	-
5	-	1.15	.16	.00	-	-	-
10	-	1.34	.15	.00	-	220	28
15	-	1.64	.15	.34	-	-	-
20	-	4.80	.14	.51	-	283	36
25	-	10.59	.14	.51	-	-	-
30	-	15.20	1.22	.92	-	623	94
35	-	7.31	2.68	2.16	-	-	-
40	-	3.74	3.96	4.48	-	-	-
45	-	3.10	4.37	4.64	-	-	-
50	-	1.64	4.86	5.47	-	-	-
55	-	1.52	5.62	6.29	-	-	-
60	-	.39	6.98	7.12	-	-	-
65	-	.33	7.28	7.78	-	-	-
70	-	.25	7.70	8.11	-	-	-
75	-	.24	8.14	8.78	-	-	-
80	-	.21	8.10	8.78	-	-	-
85	-	.18	7.43	8.37	-	-	-
90	-	.18	7.63	8.13	-	-	-
95	-	.17	7.61	8.13	-	-	-
100	-	.15	7.81	8.25	-	-	-
105	-	.17	8.45	8.81	-	-	-
108	-	.17	8.44	8.81	-	-	-

LIGHT SATURATION DATA AND RELATED BIOMASS AND NUTRIENT DATA

UNITS

P	=	mg C (mg Chl^{-1}) m^{-3} h^{-1}
I	=	W m^{-2}
P_s	=	mg C (mg Chl)$^{-1}$ h^{-1}
α	=	mg C (mg Chl)$^{-1}$ h^{-1} w^{-1} m^{-2}
β	=	mg C (mg Chl)$^{-1}$ h^{-1} w^{-1} m^{-2}

Organic particulates are in mg m^{-3}. Inorganic nutrients are in mg at m^{-3}. The 90% confidence interval for P_s, α, β are shown in the closed brackets below the estimates for each parameter.

LABRADOR SEA 1988

STATION NO. 1

LAT 46°18.2' N LONG 53°18.4' W DATE 07/05/88 DEPTH 50 M

I	P	I	P	I	P	I	P
175	.85	144	.75	106	.94	89	.98
52	.96	38	1.06	33	.91	32	.63
28	1.00	28	.78	27	.63	24	.61
23	.80	20	.57	18	.64	15	.32
13	.45	10	.19	8	.32	7	.26
7	.16	6	.12	5	.20	4	.10
3	.07	3	.12	3	.13	2	.05
1	.02	1	.07	.9	.05	.8	.03
.6	.03	.4	.01	.3	.01	.3	.01
.2	.01						

PARAMETER VALUES

PS : 1.90 (1.04, 2.76)

ALPHA : .041 (.038, .045)

BETA : .0099 (.0002, .0197)

SAMPLE TEMP .0°C

INCUBATION TEMP .0°C

CHLOROPHYLL : 8.25

CARBON : 289

NITROGEN : 46

NITRATE : .23

SILICATE : .38

PHOSPHATE : .42

LABRADOR SEA 1988

STATION NO. 1

LAT 46°18.2' N LONG 53°18.4' W DATE 07/05/88 DEPTH 20 M

I	P	I	P	I	P	I	P
255	.75	144	1.13	128	1.23	120	1.05
106	1.05	64	1.13	42	.88	35	.96
26	.74	22	.62	13	.66	9	.31
7	.26	7	.33	6	.25	5	.20
5	.23	5	.19	4	.11	3	.11
3	.09	2	.07	2	.04	2	.03
1	.03	1	.05	1	.01	1	.01
1	.04	1	.02	.9	.02	.8	.01
.7	.02	.6	.01	.5	.00	.5	.01
.5	.02						

PARAMETER VALUES

PS : 1.66 (1.48, 1.85)

ALPHA : .043 (.041, .046)

BETA : .0049 (.0032, .0066)

SAMPLE TEMP .6°C

INCUBATION TEMP .6°C

CHLOROPHYLL : 8.08

CARBON : 421

NITROGEN : 46

NITRATE : .35

SILICATE : .19

PHOSPHATE : .36

LABRADOR SEA 1988

STATION NO. 1

LAT 46°16.2' N LONG 53°18.4' W DATE 07/05/88 DEPTH 5 M

I	P	I	P	I	P	I	P
546	1.17	419	1.25	367	1.10	343	1.22
291	1.37	267	1.45	167	1.08	128	1.11
116	1.26	98	1.25	84	1.25	72	.99
42	1.25	33	1.04	23	.88	22	.56
21	.80	20	.46	15	.64	13	.45
11	.45	10	.34	9	.25	7	.35
6	.24	5	.08	4	.12	4	.11
3	.10	2	.07	2	.05	2	.04
1	.04	1	.01	1	.02	1	.02
.7	.01	.6	.02	.4	.01		

PARAMETER VALUES

PS : 1.27 (1.20, 1.34)

ALPHA : .048 (.044, .052)

BETA : .0001 (-.0001, .0004)

SAMPLE TEMP .6°C INCUBATION TEMP .6°C

CHLOROPHYLL : 8.60 CARBON : 469 NITROGEN : 54

NITRATE : .54 SILICATE : .05 PHOSPHATE : .33

LABRADOR SEA 1988

STATION NO. 2

LAT 49°54.1' N LONG 52°40.7' W DATE 08/05/88 DEPTH 40 M

I	P	I	P	I	P	I	P
538	.78	359	.82	295	1.06	255	.92
207	.99	195	1.11	112	.95	90	1.07
80	.84	70	.88	69	.97	63	.86
58	.92	57	.82	52	.73	49	.89
25	.82	24	.57	22	.49	20	.40
20	.62	13	.63	10	.46	10	.29
9	.35	8	.27	4	.24	3	.18
3	.12	3	.10	2	.11	2	.08
.9	.07	.6	.01	.5	.01		

PARAMETER VALUES

PS : 1.00 (.95, 1.06)

ALPHA : .043 (.039, .046)

BETA : .0003 (.0001, .0005)

SAMPLE TEMP -1.0°C

INCUBATION TEMP -1.0°C

CHLOROPHYLL : .71

CARBON : 109

NITROGEN : 12

NITRATE : 8.06

SILICATE : 8.72

PHOSPHATE : .94

LABRADOR SEA 1988

STATION NO. 2

LAT 49°54.1' N LONG 52°40.7' W DATE 08/05/88 DEPTH 15 M

I	P	I	P	I	P	I	P
518	.93	419	1.27	367	1.70	315	1.70
275	1.64	243	1.74	104	1.96	94	1.58
82	1.83	74	1.59	37	1.56	28	.99
24	.93	22	.95	21	.75	19	.87
14	.97	12	.78	10	.45	9	.42
7	.36	5	.39	4	.19	4	.18
4	.18	3	.12	3	.18	3	.21
3	.11	3	.11	3	.11	3	.11
2	.11	2	.09	2	.03	2	.08
2	.07	2	.07	1	.05		

PARAMETER VALUES

PS : 2.34 ALPHA : .056 BETA : .0031

(2.15, 2.52) (.053, .060) (.0022, .0039)

SAMPLE TEMP .5°C INCUBATION TEMP .5°C

CHLOROPHYLL : 18.61 CARBON : 571 NITROGEN : 102

NITRATE : .00 SILICATE : 2.55 PHOSPHATE : .44

LABRADOR SEA 1988

STATION NO. 2

LAT 49°54.1' N LONG 52°40.7' W DATE 08/05/88 DEPTH 1 M

I	P	I	P	I	P	I	P
538	1.23	399	1.27	319	1.62	271	1.75
247	1.68	223	1.74	140	1.77	116	1.71
98	1.45	94	1.51	48	1.46	37	1.21
35	1.16	33	.92	31	.95	29	.71
18	.43	18	.56	16	.52	15	.34
14	.39	8	.28	7	.31	6	.16
6	.20	5	.17	3	.12	3	.07
2	.07	2	.05	2	.04	2	.06
1	.03	.8	.01	.6	.02	.5	.02
.5	.00						

PARAMETER VALUES

PS : 2.30 (2.12, 2.49)

ALPHA : .039 (.037, .041)

BETA : .0028 (.0020, .0036)

SAMPLE TEMP .5°C

INCUBATION TEMP .5°C

CHLOROPHYLL : 9.39

CARBON : 823

NITROGEN : 66

NITRATE : .00

SILICATE : .48

PHOSPHATE : .20

LABRADOR SEA 1988

STATION NO. 3

LAT 53° 1.9' N LONG 55° .7' W DATE 09/05/88 DEPTH 10 M

I	P	I	P	I	P	I	P
359	1.53	295	1.65	255	1.93	207	1.91
195	1.95	112	2.04	90	1.83	80	1.82
63	1.65	58	1.44	57	1.62	55	1.39
53	1.43	52	1.27	49	1.30	24	.76
22	.82	20	.62	20	.71	13	.85
10	.82	10	.58	9	.46	8	.43
8	.45	4	.35	3	.22	3	.16
3	.11	2	.11	2	.09	.9	.05
.7	.03	.6	.01	.5	.01	.3	.02

PARAMETER VALUES

PS : 2.62 ALPHA : .047 BETA : .0037

(2.25, 2.99) (.044, .050) (.0018, .0056)

SAMPLE TEMP .0°C INCUBATION TEMP .0°C

CHLOROPHYLL : 11.10 CARBON : 645 NITROGEN : 86

NITRATE : .05 SILICATE : 2.48 PHOSPHATE : .31

LABRADOR SEA 1988

STATION NO. 3

LAT 53° 1.9' N LONG 55° .7' W DATE 09/05/88 DEPTH 5 M

I	P	I	P	I	P	I	P
518	1.78	419	1.88	367	1.89	315	1.59
275	1.92	243	1.69	144	2.10	104	1.86
94	2.04	82	1.84	74	1.75	72	1.59
28	1.42	24	1.23	22	.96	19	.75
12	.87	12	.68	10	.54	9	.46
7	.39	5	.27	4	.13	4	.22
4	.20	3	.13	3	.22	3	.24
3	.13	3	.15	3	.12	3	.16
2	.12	2	.09	2	.12	2	.08
2	.07	2	.08	1	.07		

PARAMETER VALUES

PS : 2.00 (1.92, 2.09)

ALPHA : .066 (.062, .070)

BETA : .0005 (.0002, .0009)

SAMPLE TEMP .0°C INCUBATION TEMP .0°C

CHLOROPHYLL : 11.27 CARBON : 619 NITROGEN : 82

NITRATE : .13 SILICATE : 2.53 PHOSPHATE : .33

LABRADOR SEA 1988

STATION NO. 3

LAT 53° 1.9' N LONG 55° .7' W DATE 09/05/88 DEPTH 1 M

I	P	I	P	I	P	I	P
538	1.99	399	2.01	271	1.87	247	2.15
223	1.90	98	2.04	84	1.68	48	1.90
37	1.90	35	1.44	33	1.27	31	1.10
23	1.48	18	.93	18	.95	16	.79
15	.64	14	.53	8	.71	7	.50
6	.35	6	.29	5	.24	5	.25
3	.19	3	.11	2	.08	2	.07
2	.06	2	.06	1	.03	.8	.04
.5	.05	.5	.03				

PARAMETER VALUES

PS : 2.05 ALPHA : .071 BETA : .0002

(1.90, 2.20) (.066, .076) (-.0003, .0006)

SAMPLE TEMP .0°C INCUBATION TEMP .0°C

CHLOROPHYLL : 10.25 CARBON : 656 NITROGEN : 82

NITRATE : .10 SILICATE : 2.54 PHOSPHATE : .31

LABRADOR SEA 1988

STATION NO. 4

LAT 52°58.6' N LONG 54°59.9' W DATE 10/05/88 DEPTH 25 M

I	P	I	P	I	P	I	P
538	.94	359	1.30	295	1.35	207	1.37
195	1.35	112	1.57	90	1.40	80	1.39
70	1.36	69	1.20	63	1.28	58	.94
53	1.18	52	1.09	49	1.01	25	.80
24	.73	22	.55	20	.57	20	.57
13	.57	10	.51	9	.31	8	.34
4	.26	3	.18	3	.14	3	.07
2	.09	2	.09	.9	.05	.7	.04
.6	.02	.5	.03	.4	.03	.3	.03

PARAMETER VALUES

PS : 1.78 (1.66, 1.90)

ALPHA : .038 (.036, .040)

BETA : .0019 (.0014, .0024)

SAMPLE TEMP -.8°C INCUBATION TEMP -.8°C

CHLOROPHYLL : 7.90

CARBON : 228

NITROGEN : 48

NITRATE : 1.76

SILICATE : 5.04

PHOSPHATE : .56

LABRADOR SEA 1988

STATION NO. 4

LAT 52°58.7' N LONG 54°59.9' W DATE 10/05/88 DEPTH 20 M

I	P	I	P	I	P	I	P
518	.46	419	.76	367	1.38	315	1.32
144	1.65	104	1.57	94	1.49	72	1.35
28	1.04	24	.85	22	.83	19	.82
14	.59	12	.47	9	.29	7	.29
5	.36	4	.28	4	.24	4	.15
3	.17	3	.24	3	.14	3	.18
3	.06	3	.13	3	.16	2	.08
2	.05	2	.10	2	.08	2	.09
2	.10	1	.08				

PARAMETER VALUES

PS : 2.29 ALPHA : .048 BETA : .0050

(2.06, 2.52) (.044, .051) (.0038, .0062)

SAMPLE TEMP -.6°C INCUBATION TEMP -.6°C

CHLOROPHYLL : 7.90 CARBON : 273 NITROGEN : 59

NITRATE : 1.32 SILICATE : 4.62 PHOSPHATE : .56

LABRADOR SEA 1988

STATION NO. 4

LAT 52°58.6' N LONG 54°59.9' W DATE 10/05/88 DEPTH 15 M

I	P	I	P	I	P	I	P
538	.76	399	1.06	319	1.24	247	1.47
140	1.47	116	1.47	110	1.34	98	1.33
94	1.27	84	1.16	48	1.20	37	.94
35	1.03	33	.89	31	.81	29	.68
18	.74	18	.58	16	.56	15	.38
14	.42	8	.40	7	.28	6	.27
6	.18	5	.16	5	.17	3	.14
3	.11	2	.08	2	.09	2	.06
2	.08	1	.07	.8	.01	.6	.07
.5	.04	.5	.04	.5	.04		

PARAMETER VALUES

PS : 1.80 (1.69, 1.91)

ALPHA : .039 (.037, .041)

BETA : .0024 (.0019, .0029)

SAMPLE TEMP -.6°C INCUBATION TEMP -.6°C

CHLOROPHYLL : 8.72 CARBON : 254 NITROGEN : 57

NITRATE : 1.17 SILICATE : 4.37 PHOSPHATE : .53

LABRADOR SEA 1988

STATION NO. 5

LAT 54° 4.0' N LONG 54°54.5' W DATE 11/05/88 DEPTH 20 M

I	P	I	P	I	P	I	P
538	1.12	359	1.38	295	1.32	255	1.38
207	1.31	112	1.38	90	1.42	80	1.29
69	1.24	63	1.18	58	1.13	57	1.18
55	1.05	53	1.11	52	1.00	49	1.11
31	1.07	25	1.01	24	.81	22	.71
20	.59	20	.57	13	.71	10	.53
10	.43	9	.37	8	.30	8	.27
4	.24	3	.16	3	.13	3	.09
2	.07	2	.06	.9	.03	.7	.03
.6	.01	.5	.01	.4	.01	.3	.02

PARAMETER VALUES

PS : 1.41 (1.34, 1.47)

ALPHA : .049 (.046, .051)

BETA : .0004 (.0001, .0006)

SAMPLE TEMP -.4°C INCUBATION TEMP -.4°C

CHLOROPHYLL : 10.76 CARBON : 462 NITROGEN : 78

NITRATE : .28 SILICATE : 5.26 PHOSPHATE : .41

LABRADOR SEA 1988

STATION NO. 5

LAT 54° 4.0' N LONG 54°54.5' W DATE 11/05/88 DEPTH 10 M

I	P	I	P	I	P	I	P
518	.92	419	1.33	367	1.46	315	1.45
275	1.44	243	1.46	144	1.48	104	1.45
94	1.43	82	1.47	74	1.42	72	1.26
37	1.29	28	1.22	24	1.09	22	.96
21	.84	19	.70	14	.88	12	.80
12	.67	10	.51	9	.43	7	.31
5	.39	4	.30	4	.21	4	.17
3	.15	3	.19	3	.22	3	.11
3	.15	3	.11	3	.15	2	.12
2	.08	2	.11	2	.07	2	.05
2	.07	1	.06				

PARAMETER VALUES

PS : 1.58 (1.52, 1.65)

ALPHA : .067 (.064, .071)

BETA : .0008 (.0006, .0011)

SAMPLE TEMP -.2°C INCUBATION TEMP -.2°C

CHLOROPHYLL : 9.39 CARBON : 519 NITROGEN : 86

NITRATE : .18 SILICATE : 5.11 PHOSPHATE : .41

LABRADOR SEA 1988

STATION NO. 5

LAT 54° 4.0' N LONG 54°54.5' W DATE 11/05/88 DEPTH 1 M

I	P	I	P	I	P	I	P
538	1.33	399	1.36	319	1.48	271	1.44
247	1.39	223	1.49	140	1.47	110	1.45
98	1.28	94	1.24	84	1.22	48	1.32
37	1.20	35	1.14	33	1.00	31	.83
23	1.09	18	.86	18	.64	16	.56
15	.46	14	.40	8	.42	7	.33
6	.25	6	.20	5	.16	5	.15
3	.12	3	.08	2	.05	2	.04
2	.03	2	.03	1	.03	.8	.03
.6	.02	.5	.02	.5	.00	.5	.01

PARAMETER VALUES

PS : 1.45 (1.38, 1.52)

ALPHA : .052 (.049, .055)

BETA : .0001 (-.0001, .0004)

SAMPLE TEMP -.2°C INCUBATION TEMP -.2°C

CHLOROPHYLL : 11.10 CARBON : 608 NITROGEN : 97

NITRATE : .12 SILICATE : 5.15 PHOSPHATE : .37

LABRADOR SEA 1988

STATION NO. 6

LAT 53°51.9' N LONG 52°44.2' W DATE 12/05/88 DEPTH 10 M

I	P	I	P	I	P	I	P
538	.77	359	1.39	295	1.62	255	1.60
207	1.75	195	1.84	112	1.90	90	1.78
80	1.84	70	1.75	69	1.65	63	1.76
58	1.55	57	1.67	55	1.51	53	1.48
52	1.49	49	1.47	31	1.58	25	1.42
22	.94	20	.76	20	.85	13	.70
10	.78	10	.65	9	.51	8	.44
8	.34	4	.34	3	.23	3	.08
3	.08	2	.12	2	.10	.9	.05
.7	.02	.6	.03	.5	.03	.4	.02
.3	.01						

PARAMETER VALUES

PS : 2.36 (2.20, 2.53)

ALPHA : .061 (.058, .065)

BETA : .0038 (.0029, .0047)

SAMPLE TEMP -.9°C

INCUBATION TEMP -.9°C

CHLOROPHYLL : 13.49

CARBON : 375

NITROGEN : 80

NITRATE : 1.91

SILICATE : 3.56

PHOSPHATE : .44

LABRADOR SEA 1988

STATION NO. 6

LAT 53°51.9' N LONG 52°44.2' W DATE 12/05/88 DEPTH 5 M

I	P	I	P	I	P	I	P
518	1.95	419	1.97	367	1.92	315	2.00
275	1.80	144	1.65	104	1.93	82	1.48
74	1.69	37	1.37	28	1.28	24	1.04
22	.88	21	.74	19	.74	12	.62
12	.48	10	.39	9	.33	7	.25
5	.32	4	.25	4	.11	4	.11
3	.10	3	.14	3	.19	3	.05
3	.12	3	.07	3	.07	2	.08
2	.05	2	.05	2	.06	2	.04
2	.02	1	.04				

PARAMETER VALUES

PS : 1.90 ALPHA : .053 BETA : .0000

(1.80, 2.00) (.050, .056) (-.0003, .0003)

SAMPLE TEMP -.6°C INCUBATION TEMP -.6°C

CHLOROPHYLL : 19.64 CARBON : 813 NITROGEN : 113

NITRATE : .00 SILICATE : .92 PHOSPHATE : .27

LABRADOR SEA 1988

STATION NO. 6

LAT 53°51.9' N LONG 52°44.2' W DATE 12/05/88 DEPTH 1 M

I	P	I	P	I	P	I	P
538	1.85	399	1.97	319	1.94	271	1.95
247	1.88	140	2.07	116	1.92	110	1.75
98	1.67	94	1.55	84	1.48	48	1.64
37	1.38	35	1.19	33	1.03	23	1.30
18	.86	18	.45	16	.37	15	.48
14	.41	8	.52	7	.33	6	.21
6	.17	5	.07	5	.16	3	.11
3	.05	2	.04	2	.01	2	.02
1	.02	.8	.01	.5	.00		

PARAMETER VALUES

PS : 1.95 (1.81, 2.09)

ALPHA : .049 (.045, .053)

BETA : .0001 (-.0004, .0005)

SAMPLE TEMP -.6°C

INCUBATION TEMP -.6°C

CHLOROPHYLL : 16.91

CARBON : 932

NITROGEN : 108

NITRATE : .00

SILICATE : .95

PHOSPHATE : .23

LABRADOR SEA 1988

STATION NO. 7

LAT 53°45.9' N LONG 53° 1.7' W DATE 13/05/88 DEPTH 10 M

I	P	I	P	I	P	I	P
538	1.69	359	1.43	295	1.44	255	1.89
207	2.04	195	1.91	112	1.75	90	1.96
80	2.09	70	1.86	63	1.54	58	1.65
57	1.71	55	1.53	52	1.31	49	1.39
31	1.59	25	1.37	24	1.14	22	1.00
20	.71	20	.89	10	.61	10	.60
9	.60	8	.37	8	.31	4	.38
3	.27	3	.19	3	.15	2	.12
2	.12	.9	.07	.7	.02	.6	.04
.5	.03	.4	.02	.3	.02		

PARAMETER VALUES

PS : 2.06 ALPHA : .065 BETA : .0012

(1.93, 2.20) (.060, .070) (.0006, .0018)

SAMPLE TEMP -.6°C INCUBATION TEMP -.6°C

CHLOROPHYLL : 21.86 CARBON : 798 NITROGEN : 123

NITRATE : .35 SILICATE : .09 PHOSPHATE : -

LABRADOR SEA 1988

STATION NO. 7

LAT 53°45.9' N LONG 53° 1.7' W DATE 13/05/88 DEPTH 5 M

I	P	I	P	I	P	I	P
518	1.63	419	1.83	367	1.70	315	1.80
275	1.82	243	1.76	144	1.47	104	1.53
94	1.34	74	1.28	72	1.22	28	1.26
24	.92	22	.87	21	.70	19	.79
12	.72	12	.55	10	.43	9	.33
7	.41	5	.42	4	.27	4	.17
4	.17	3	.17	3	.20	3	.13
3	.11	3	.08	3	.11	2	.10
2	.03	2	.10	2	.06	2	.05
2	.07	1	.06				

PARAMETER VALUES

PS : 1.65 (1.55, 1.75)

ALPHA : .053 (.049, .057)

BETA : .0000 (-.0003, .0003)

SAMPLE TEMP -.3°C

INCUBATION TEMP -.3°C

CHLOROPHYLL : 22.20

CARBON : 901

NITROGEN : 114

NITRATE : .22

SILICATE : .32

PHOSPHATE : -

LABRADOR SEA 1988

STATION NO. 7

LAT 53°45.9' N LONG 53° 1.7' W DATE 13/05/88 DEPTH 1 M

I	P	I	P	I	P	I	P
538	1.81	399	2.18	319	2.31	247	2.25
223	2.04	140	2.26	116	2.19	110	1.95
98	1.83	84	1.72	37	1.38	35	1.30
33	1.20	31	.84	29	.94	18	.98
18	.83	16	.52	15	.47	14	.47
8	.53	7	.37	6	.24	6	.20
5	.14	5	.16	3	.16	3	.10
2	.06	2	.05	2	.03	2	.04
1	.06	.8	.02	.6	.02	.5	.00
.5	.01	.5	.00				

PARAMETER VALUES

PS : 2.49 (2.32, 2.65)

ALPHA : .046 (.043, .048)

BETA : .0011 (.0006, .0017)

SAMPLE TEMP -.2°C INCUBATION TEMP -.2°C

CHLOROPHYLL : 14.34 CARBON : 866 NITROGEN : 96

NITRATE : .12 SILICATE : .47 PHOSPHATE : -

LABRADOR SEA 1988

STATION NO. 8

LAT 53°34.3' N LONG 53°10.5' W DATE 14/05/88 DEPTH 25 M

I	P	I	P	I	P	I	P
538	1.53	359	1.96	295	2.51	255	2.46
207	2.32	195	2.52	112	2.65	90	2.72
80	2.67	70	2.54	69	2.23	63	1.89
58	2.00	57	2.08	55	1.87	53	1.96
52	1.75	49	1.97	25	1.50	24	1.39
22	1.09	20	.87	20	1.23	13	1.25
10	.91	10	.69	9	.60	8	.51
8	.47	4	.52	3	.26	3	.18
3	.20	2	.16	2	.12	.9	.06
.7	.04	.6	.04	.5	.02	.4	.01
.3	.01						

PARAMETER VALUES

PS : 3.34 (3.06, 3.62)

ALPHA : .069 (.065, .073)

BETA : .0045 (.0032, .0058)

SAMPLE TEMP -.6°C

INCUBATION TEMP -.6°C

CHLOROPHYLL : 10.76

CARBON : 352

NITROGEN : 102

NITRATE : 2.34

SILICATE : 3.03

PHOSPHATE : -

LABRADOR SEA 1988

STATION NO. 8

LAT 53°34.3' N LONG 53°10.5' W DATE 14/05/88 DEPTH 20 M

I	P	I	P	I	P	I	P
518	1.24	419	1.92	367	2.53	315	2.71
275	2.71	243	2.74	144	2.82	104	2.79
94	2.71	82	2.70	74	2.51	72	2.26
37	2.41	28	1.89	24	1.81	22	1.55
21	1.39	19	1.21	12	.98	12	.99
10	.86	9	.64	7	.60	5	.67
4	.46	4	.37	4	.31	3	.28
3	.33	3	.41	3	.22	3	.25
3	.21	3	.25	2	.20	2	.19
2	.20	2	.13	2	.11	2	.14
1	.14						

PARAMETER VALUES

PS : 3.42 ALPHA : .094 BETA : .0042

(3.22, 3.63) (.088, .100) (.0032, .0051)

SAMPLE TEMP -.6°C INCUBATION TEMP -.6°C

CHLOROPHYLL : 13.06 CARBON : 439 NITROGEN : 99

NITRATE : .53 SILICATE : .55 PHOSPHATE : -

LABRADOR SEA 1988

STATION NO. 8

LAT 53°34.3' N LONG 53°10.5' W DATE 14/05/88 DEPTH 15 M

I	P	I	P	I	P	I	P
538	1.16	399	1.78	319	1.98	271	2.09
247	1.98	223	1.96	140	2.04	116	2.07
110	2.09	98	1.91	94	1.79	84	1.72
48	1.89	37	1.79	35	1.45	33	1.22
31	1.24	29	1.15	18	1.18	18	.95
16	.85	15	.70	14	.61	8	.65
7	.52	6	.41	6	.32	5	.29
5	.31	3	.21	3	.16	2	.12
2	.08	2	.07	2	.08	1	.06
.8	.05	.6	.03	.5	.03	.5	.03
.5	.03						

PARAMETER VALUES

PS : 2.36 (2.23, 2.49)

ALPHA : .066 (.062, .070)

BETA : .0021 (.0015, .0026)

SAMPLE TEMP -.6°C

INCUBATION TEMP -.6°C

CHLOROPHYLL : 25.27

CARBON : 643

NITROGEN : 122

NITRATE : .20

SILICATE : .25

PHOSPHATE : -

LABRADOR SEA 1988

STATION NO. 9

LAT 50°34.0' N LONG 57°49.5' W DATE 16/05/88 DEPTH 20 M

I	P	I	P	I	P	I	P
538	.58	359	.64	295	.94	207	1.10
112	1.09	80	1.17	69	1.14	63	1.10
58	.97	55	.94	52	.96	31	.98
25	1.04	24	.93	20	.70	20	.61
13	.81	10	.63	10	.31	9	.48
8	.22	4	.27	3	.25	3	.18
3	.07	2	.08	2	.08	.9	.06
.7	.02	.6	.04	.5	.05	.4	.00
.3	.01						

PARAMETER VALUES

PS : 1.24 ALPHA : .062 BETA : .0016

(1.16, 1.32) (.057, .068) (.0012, .0021)

SAMPLE TEMP .2°C INCUBATION TEMP .2°C

CHLOROPHYLL : 13.32 CARBON : 574 NITROGEN : 78

NITRATE : .17 SILICATE : .98 PHOSPHATE : -

LABRADOR SEA 1988

STATION NO. 9

LAT 50°34.0' N LONG 57°49.5' W DATE 16/06/88 DEPTH 10 M

I	P	I	P	I	P	I	P
518	.76	419	.81	367	1.12	315	1.18
275	1.09	243	1.01	144	1.01	94	1.05
82	.99	74	1.05	72	.98	28	.72
24	.81	22	.86	21	.64	19	.59
14	.65	12	.47	12	.48	10	.43
9	.33	7	.29	5	.27	4	.24
4	.18	4	.12	3	.09	3	.17
3	.14	3	.04	3	.09	3	.06
3	.10	2	.10	2	.10	2	.03
2	.06	2	.03	2	.03	1	.01

PARAMETER VALUES

PS : 1.13 (1.08, 1.19)

ALPHA : .050 (.047, .054)

BETA : .0005 (.0003, .0007)

SAMPLE TEMP 1.3°C INCUBATION TEMP 1.3°C

CHLOROPHYLL : 3.74 CARBON : 334 NITROGEN : 42

NITRATE : .18 SILICATE : .38 PHOSPHATE : -

LABRADOR SEA 1988

STATION NO. 9

LAT 50°34.0' N LONG 57°49.5' W DATE 16/06/88 DEPTH 1 M

I	P	I	P	I	P	I	P
538	1.63	399	1.30	319	1.55	271	1.62
247	1.54	223	1.32	140	1.21	116	1.37
110	1.32	94	1.14	84	1.11	37	.92
35	1.01	33	.96	31	.70	29	.80
23	.81	18	.70	16	.56	15	.46
14	.44	8	.37	7	.39	6	.24
6	.15	5	.11	5	.15	3	.13
3	.09	2	.07	2	.05	2	.04
2	.05	1	.00	.8	.01	.6	.01

PARAMETER VALUES

PS : 1.42 (1.34, 1.51)

ALPHA : .041 (.038, .044)

BETA : .0000 (-.0003, .0003)

SAMPLE TEMP 2.5°C INCUBATION TEMP 2.5°C

CHLOROPHYLL : 1.79 CARBON : 261 NITROGEN : 37

NITRATE : .16 SILICATE : .00 PHOSPHATE : -

LABRADOR SEA 1988

STATION NO. 10

LAT 50°34.6' N LONG 57°48.0' W DATE 17/05/88 DEPTH 30 M

I	P	I	P	I	P	I	P
558	.39	431	.79	335	1.06	263	.95
207	1.19	159	1.20	132	1.28	90	1.35
82	1.31	75	1.28	66	1.25	64	.98
56	.90	52	1.34	46	1.11	38	1.17
38	1.16	33	1.07	25	.94	15	.54
12	.70	12	.46	10	.37	10	.60
7	.40	5	.32	4	.32	4	.24
3	.20	3	.16	2	.10	2	.07
.9	.06	.8	.05	.7	.04	.5	.02
.4	.01	.4	.01				

PARAMETER VALUES

PS : 1.53 (1.43, 1.62)

ALPHA : .058 (.053, .063)

BETA : .0025 (.0020, .0031)

SAMPLE TEMP -.2°C

INCUBATION TEMP -.2°C

CHLOROPHYLL : 15.20

CARBON : 623

NITROGEN : 94

NITRATE : 1.22

SILICATE : .92

PHOSPHATE : -

LABRADOR SEA 1988

STATION NO. 10

LAT 50°34.6' N LONG 57°48.0' W DATE 17/05/88 DEPTH 20 M

I	P	I	P	I	P	I	P
558	.46	391	.59	339	.68	303	.72
271	.92	251	.91	124	.94	108	.97
84	.86	71	.92	61	.86	53	.79
24	.71	22	.78	17	.72	14	.67
14	.63	10	.53	9	.45	6	.30
5	.27	4	.28	4	.21	3	.19
3	.14	3	.09	2	.12	2	.12
2	.10	2	.11	2	.11	2	.09
2	.10	2	.08	2	.05	2	.04
1	.04						

PARAMETER VALUES

PS : 1.02 ALPHA : .064 BETA : .0011

(.98, 1.06) (.060, .068) (.0009, .0013)

SAMPLE TEMP .8°C INCUBATION TEMP .8°C

CHLOROPHYLL : 4.80 CARBON : 283 NITROGEN : 36

NITRATE : .14 SILICATE : .51 PHOSPHATE : -

LABRADOR SEA 1988

STATION NO. 10

LAT 50°34.6' N LONG 57°48.0' W DATE 17/05/88 DEPTH 10 M

I	P	I	P	I	P	I	P
411	.82	299	.82	263	.82	227	.74
167	.64	144	.71	124	.77	85	.76
75	.64	47	.72	35	.70	31	.48
26	.59	23	.38	22	.56	20	.38
17	.48	13	.31	11	.37	9	.22
9	.28	8	.23	6	.21	5	.15
4	.14	4	.17	3	.06	3	.06
2	.06	2	.04	2	.01	2	.02
1	.05	1	.03	.9	.01	.7	.02
.5	.03	.4	.00				

PARAMETER VALUES

PS : .76 (.71, .80)

ALPHA : .036 (.033, .038)

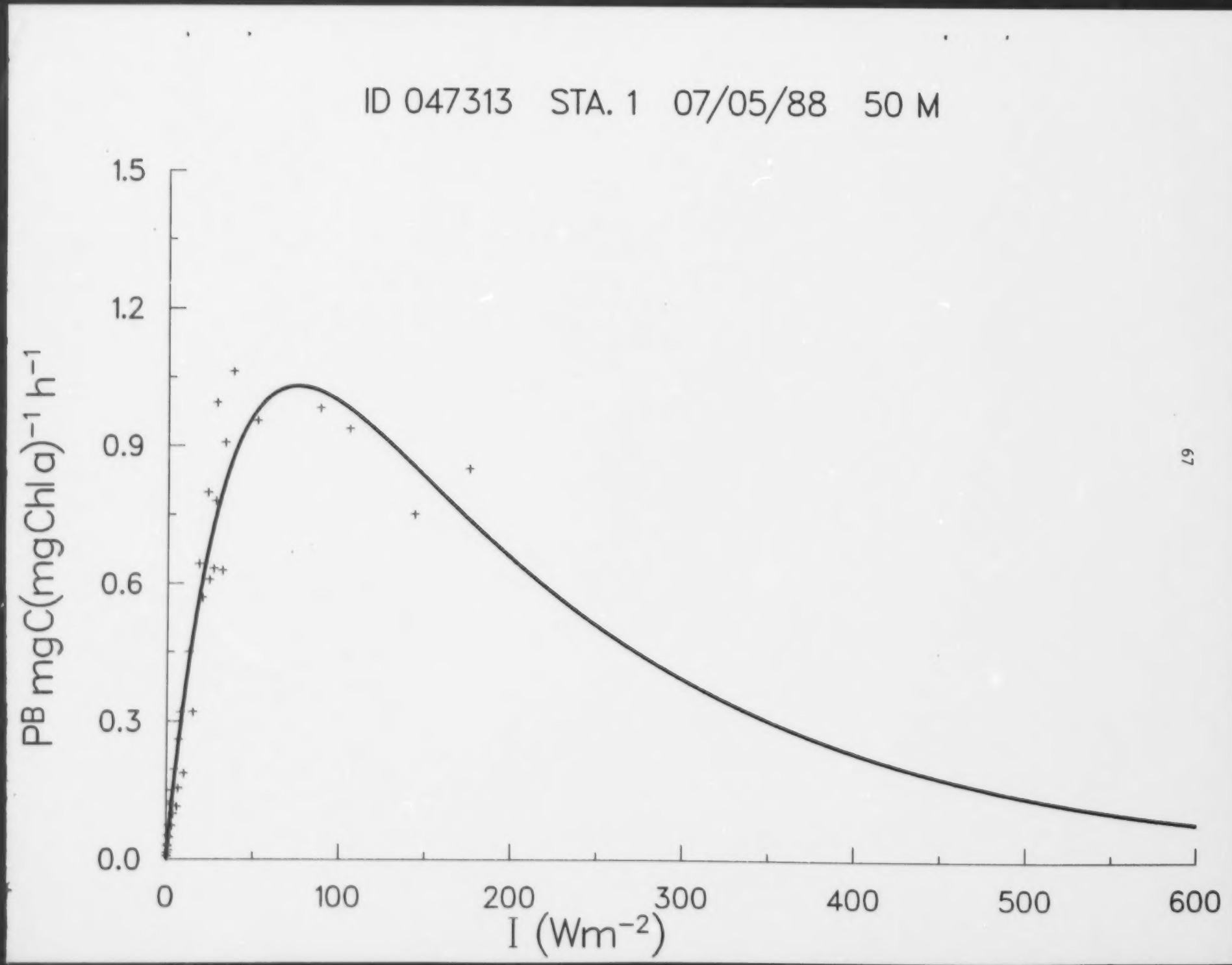
BETA : .0000 (-.0002, .0002)

SAMPLE TEMP 2.2°C INCUBATION TEMP 2.2°C

CHLOROPHYLL : 1.34 CARBON : 220 NITROGEN : 28

NITRATE : .15 SILICATE : .00 PHOSPHATE : -

SOLID LINE FIT TO PI DATA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1.2
0.9
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0.3
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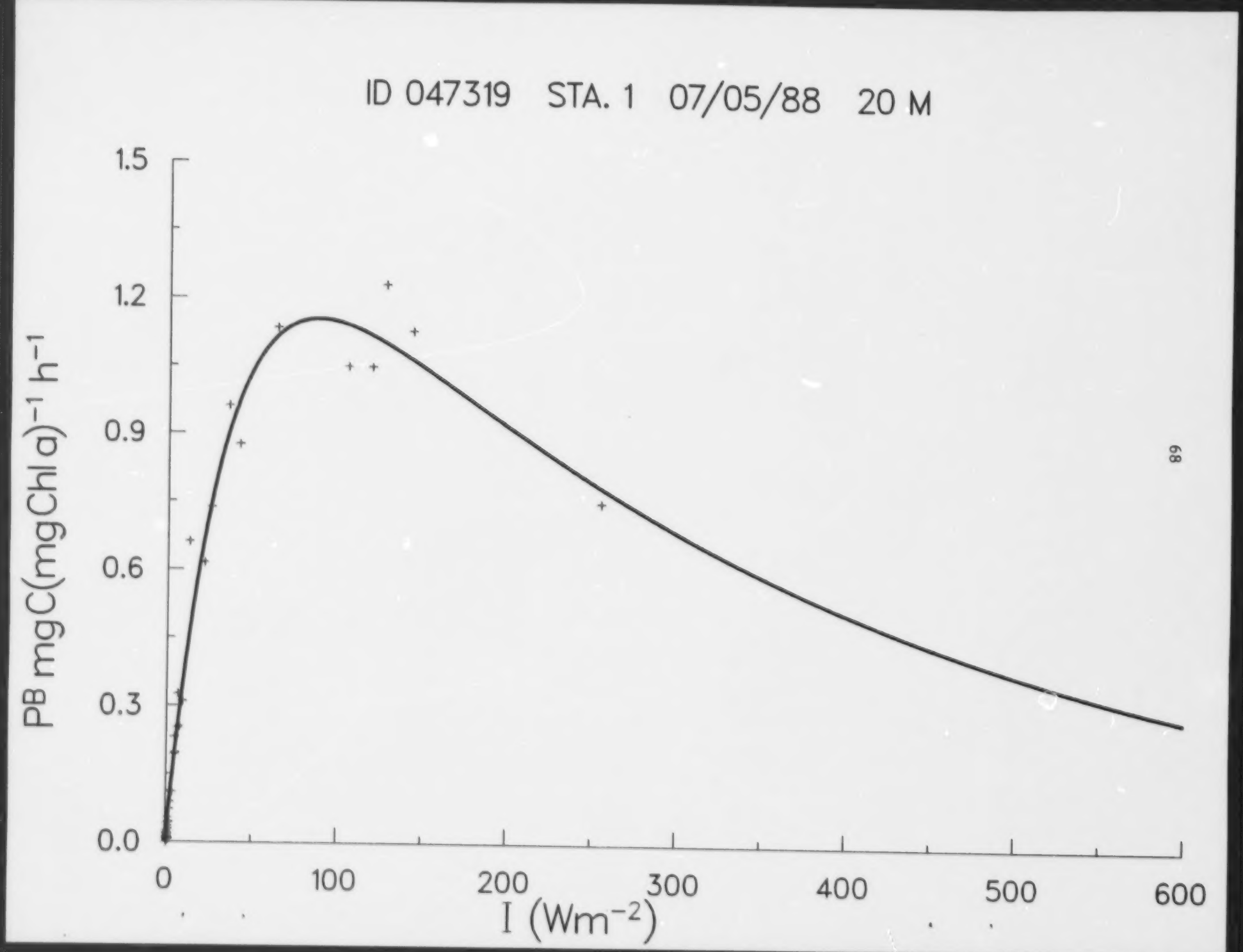
0
100
200
300
400
500
600
I (Wm^{-2})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0.3
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100
200
300
400
500
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I (Wm^{-2})
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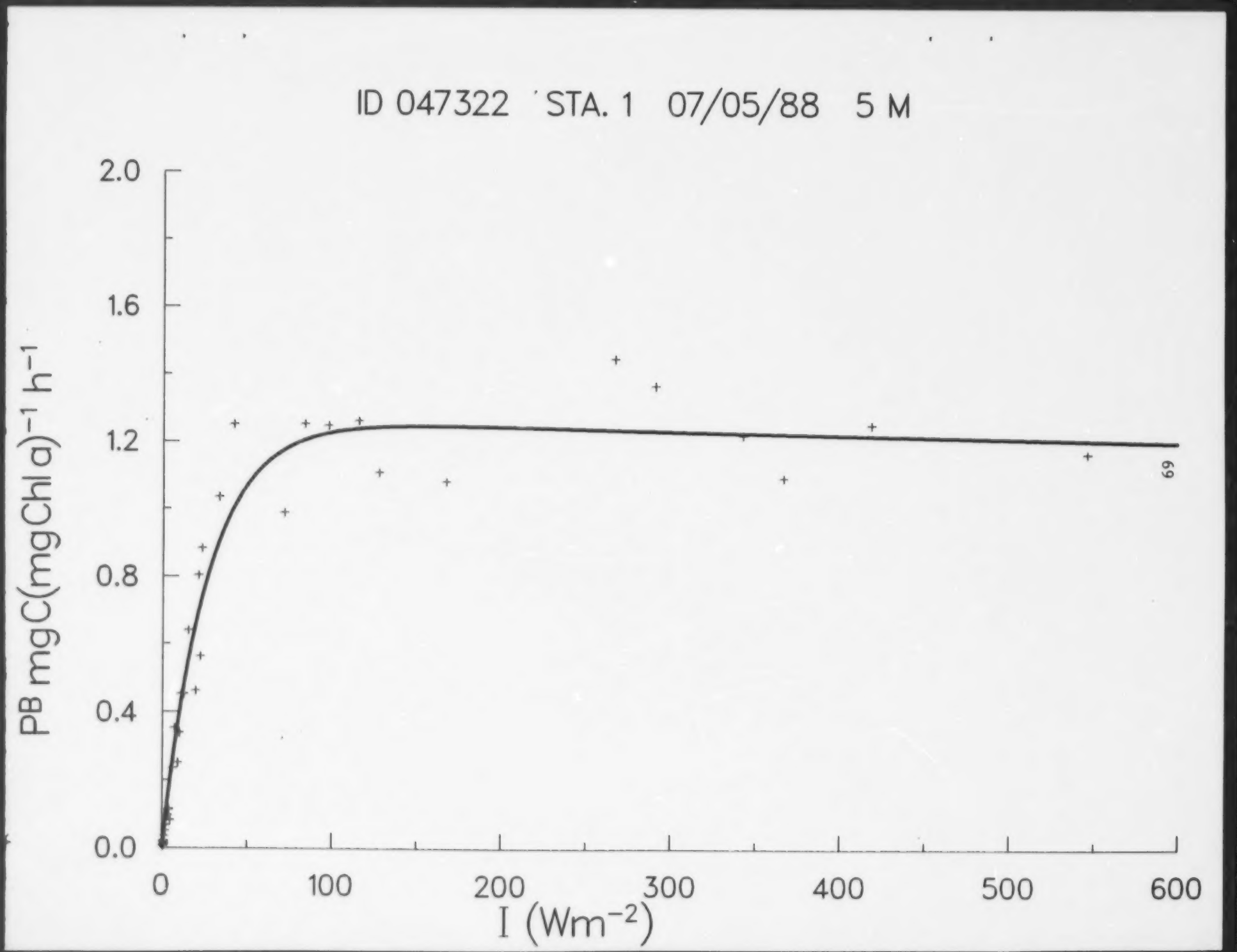
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0.4
0.0
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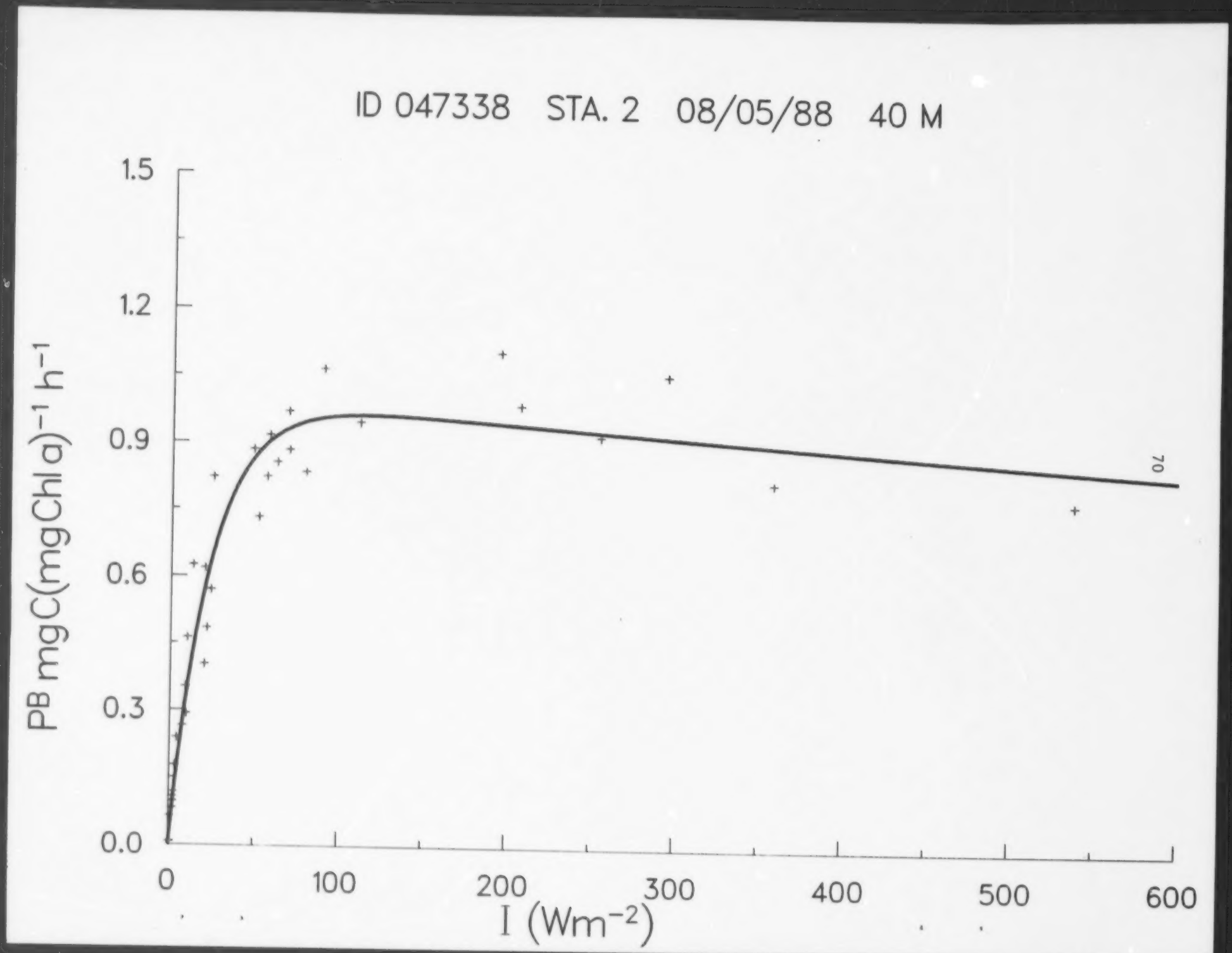
100
200
300
400
500
600
I (Wm^{-2})
69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1.2
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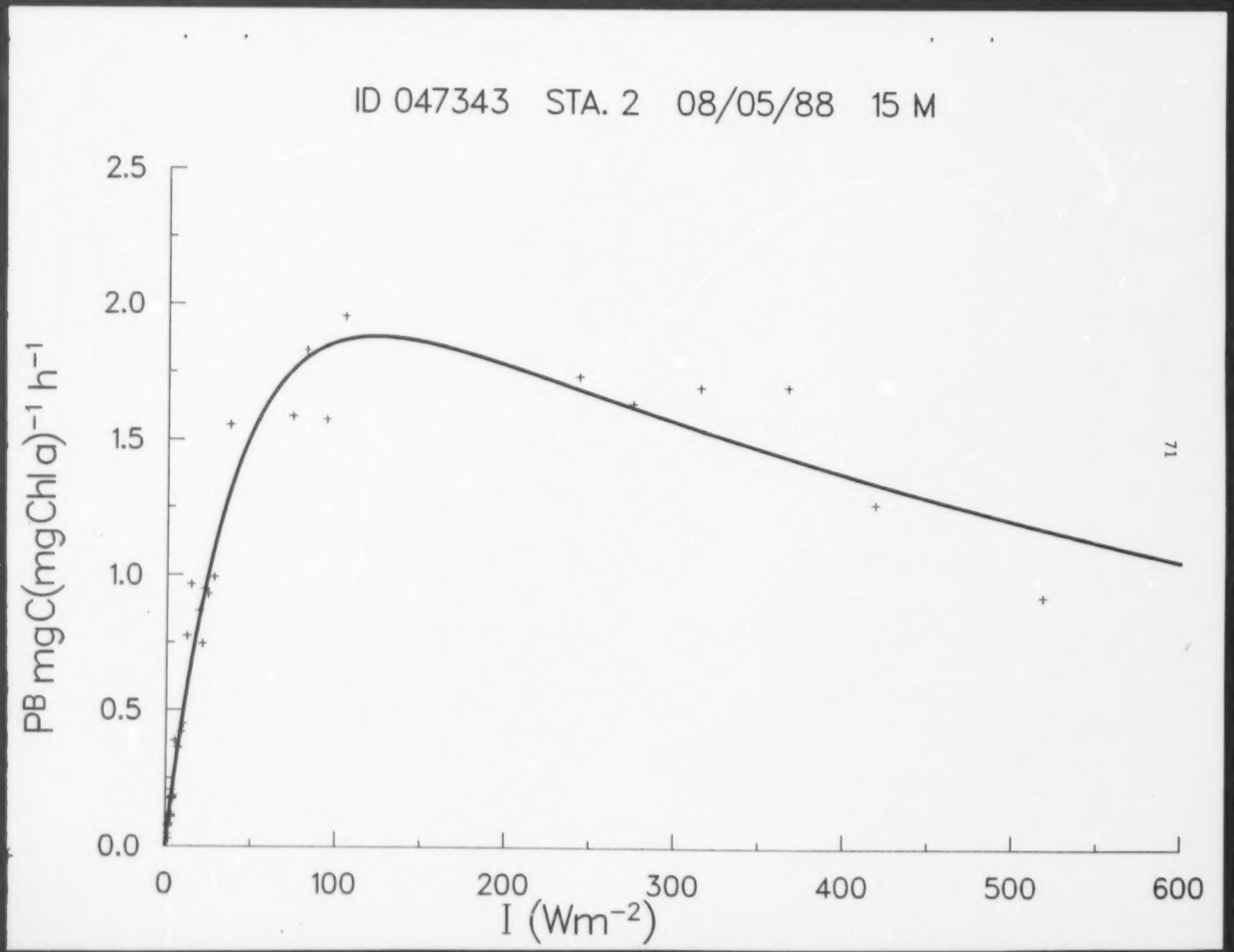
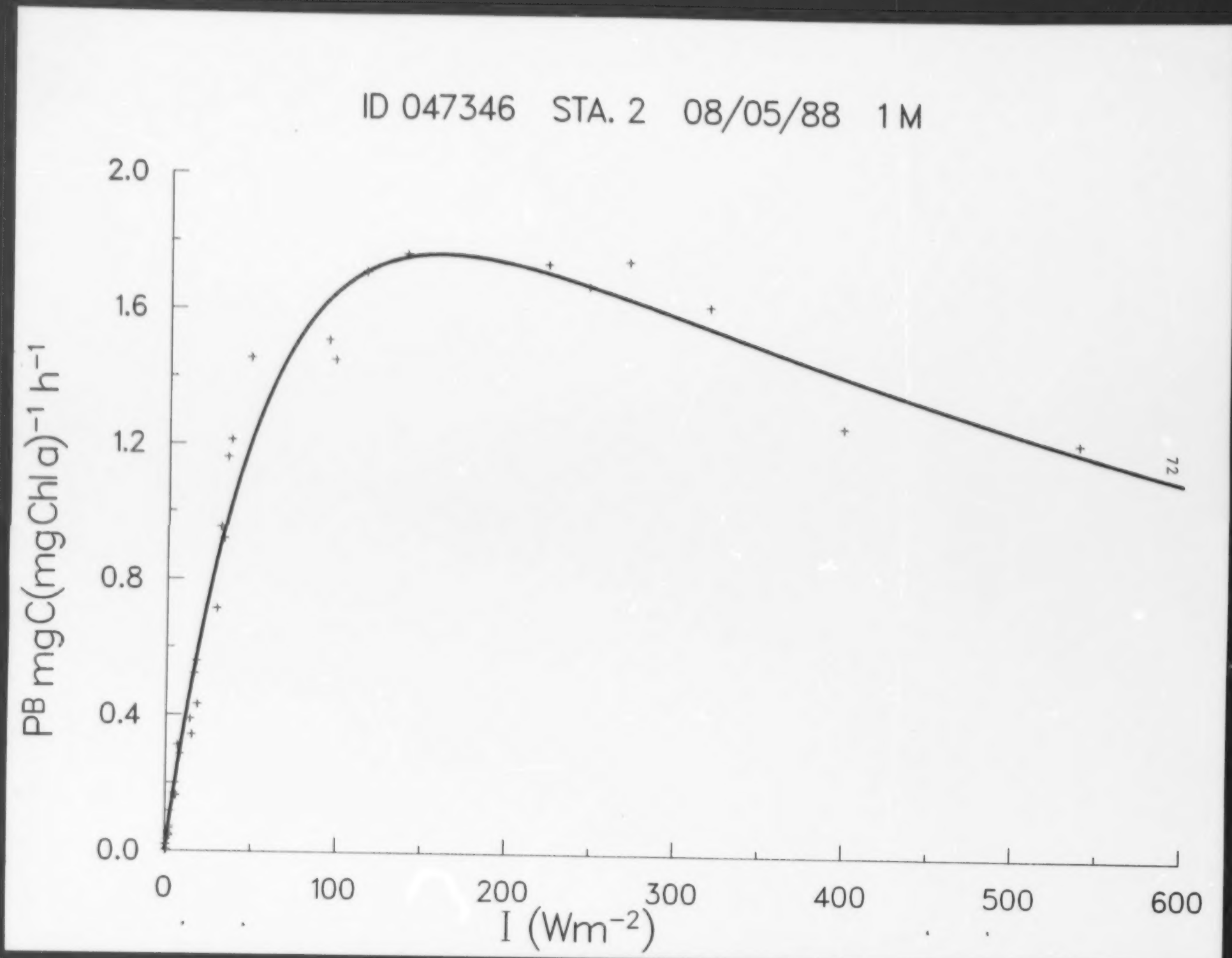
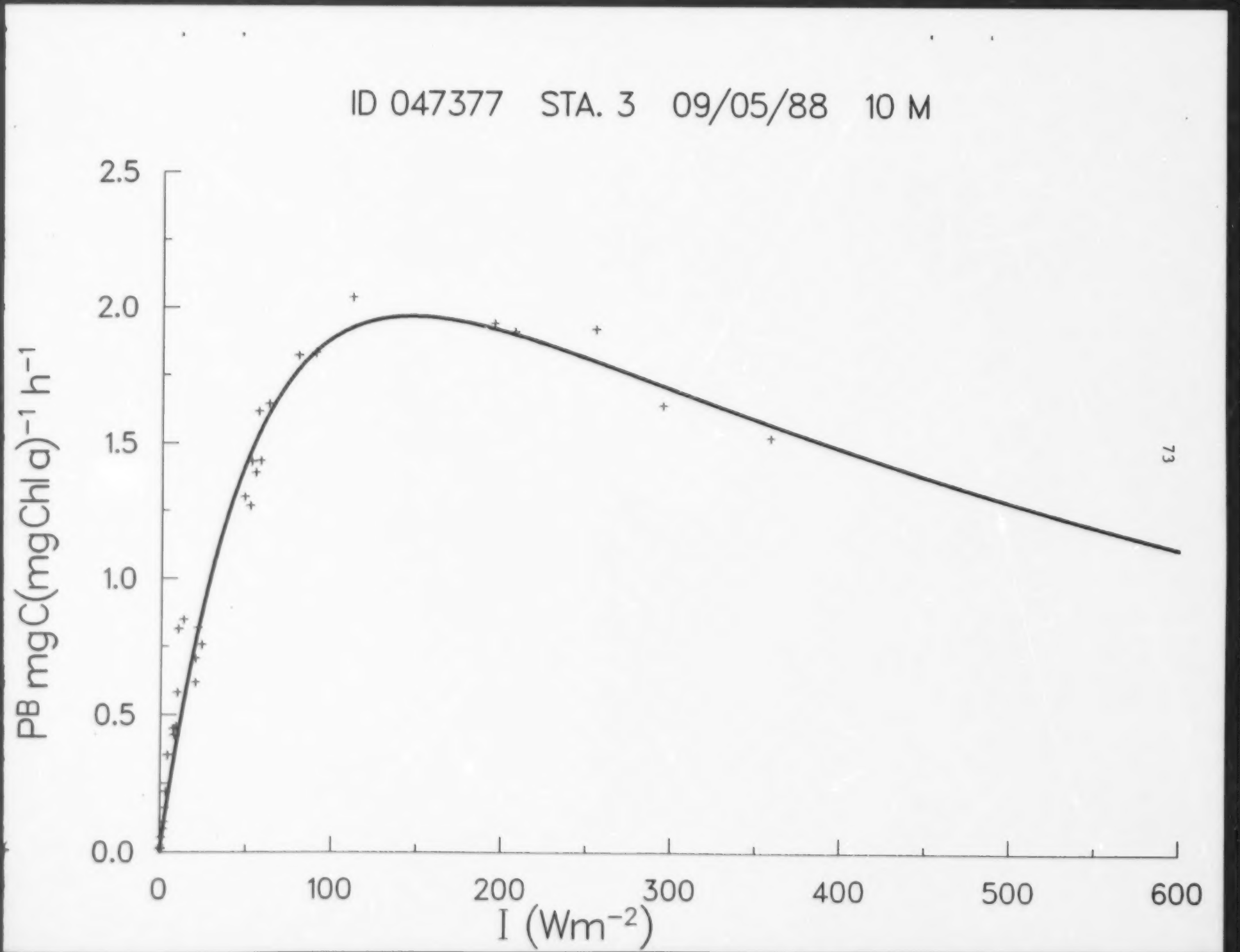
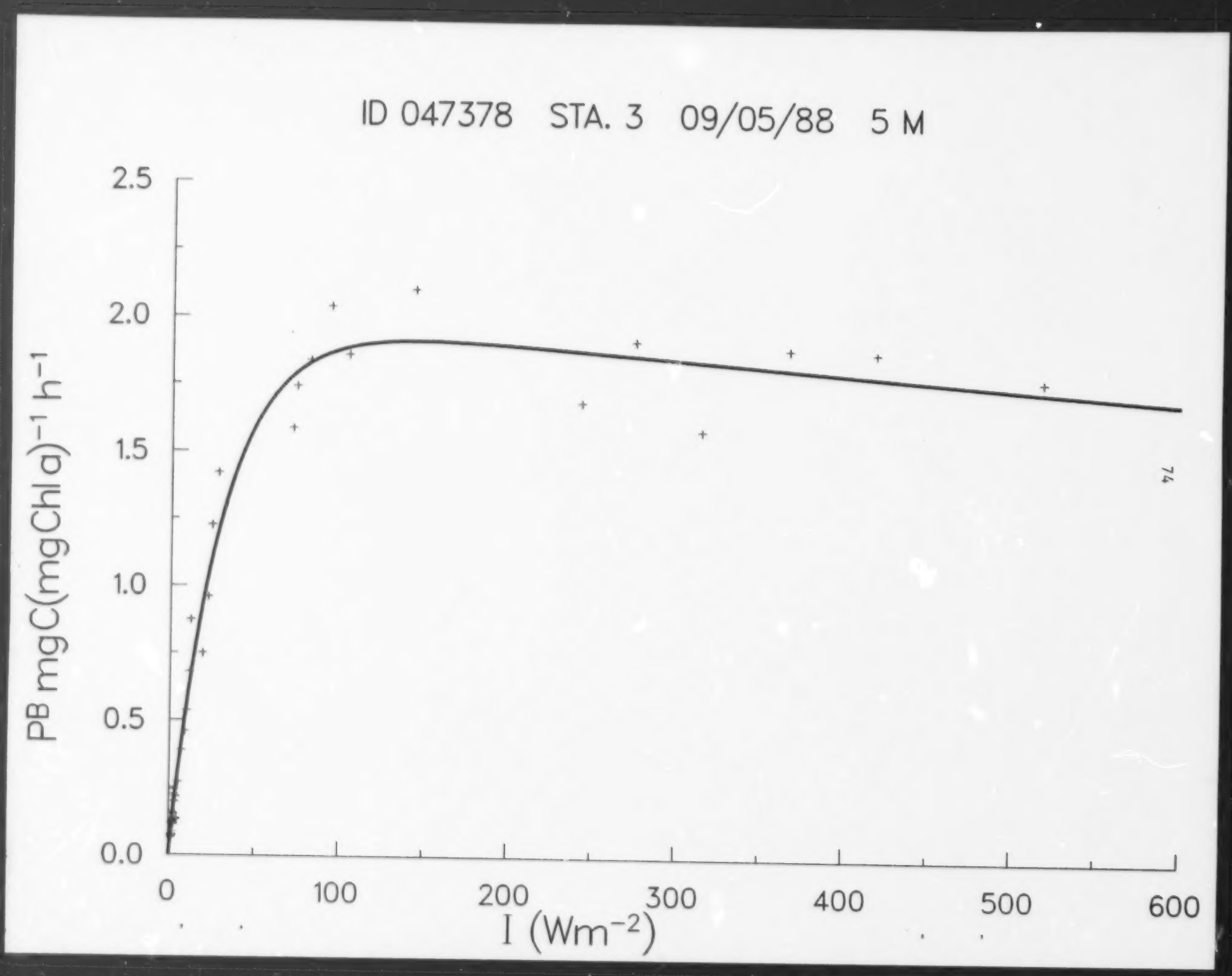
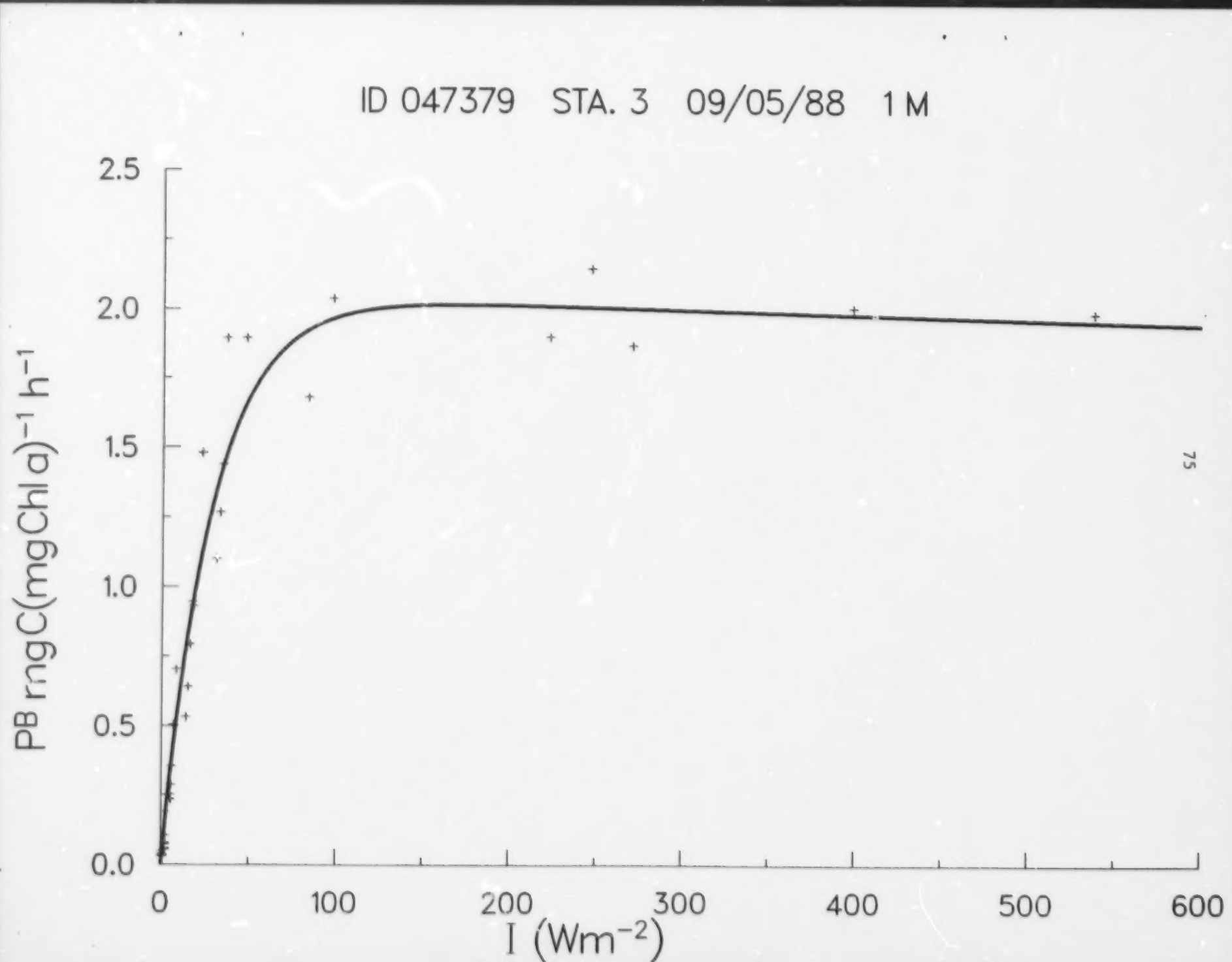
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
70

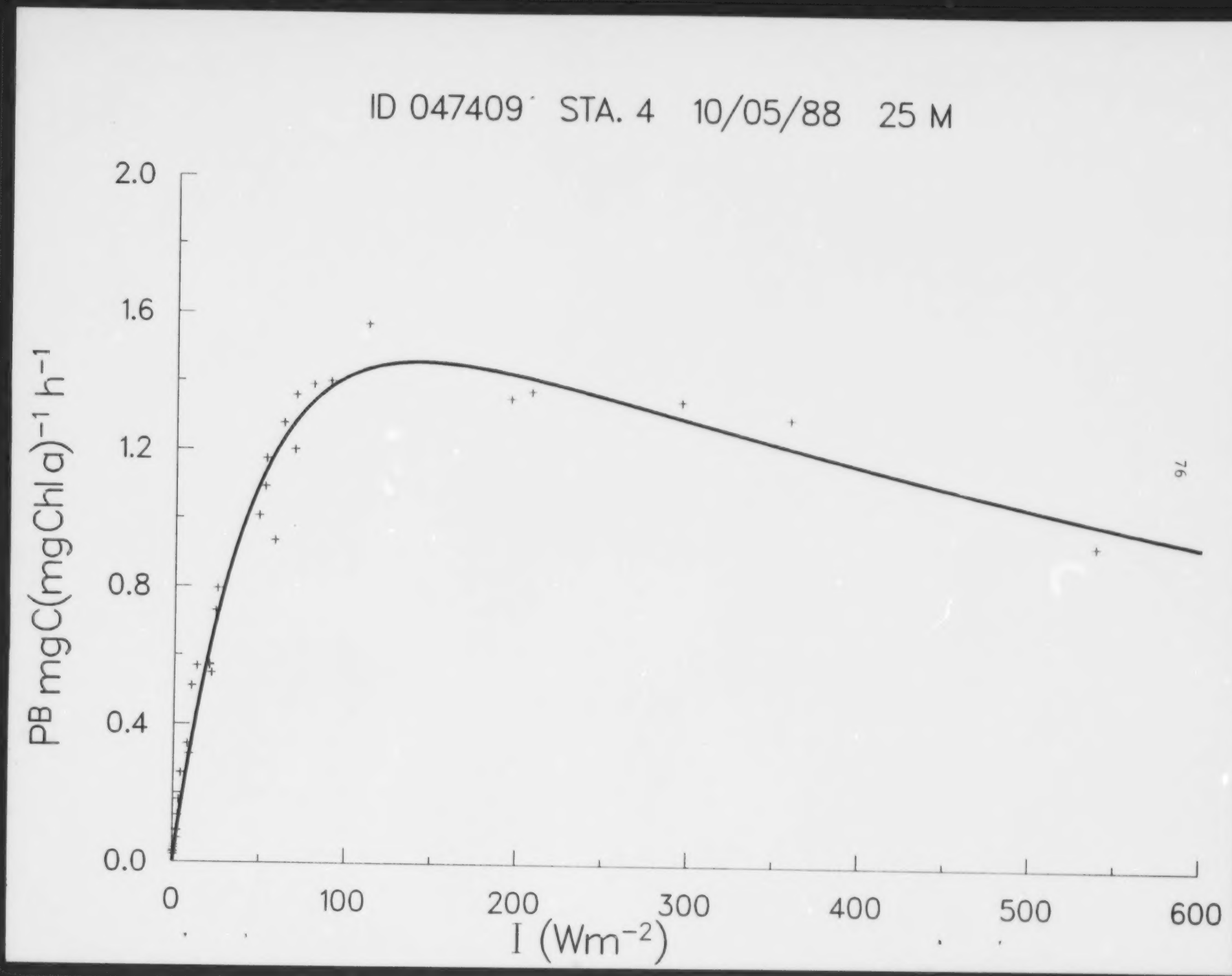

ID 047343 STA. 2 08/05/88 15 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
2.5
2.0
1.5
1.0
0.5
0.0
0
100
200
300
400
500
600
I (Wm^{-2})

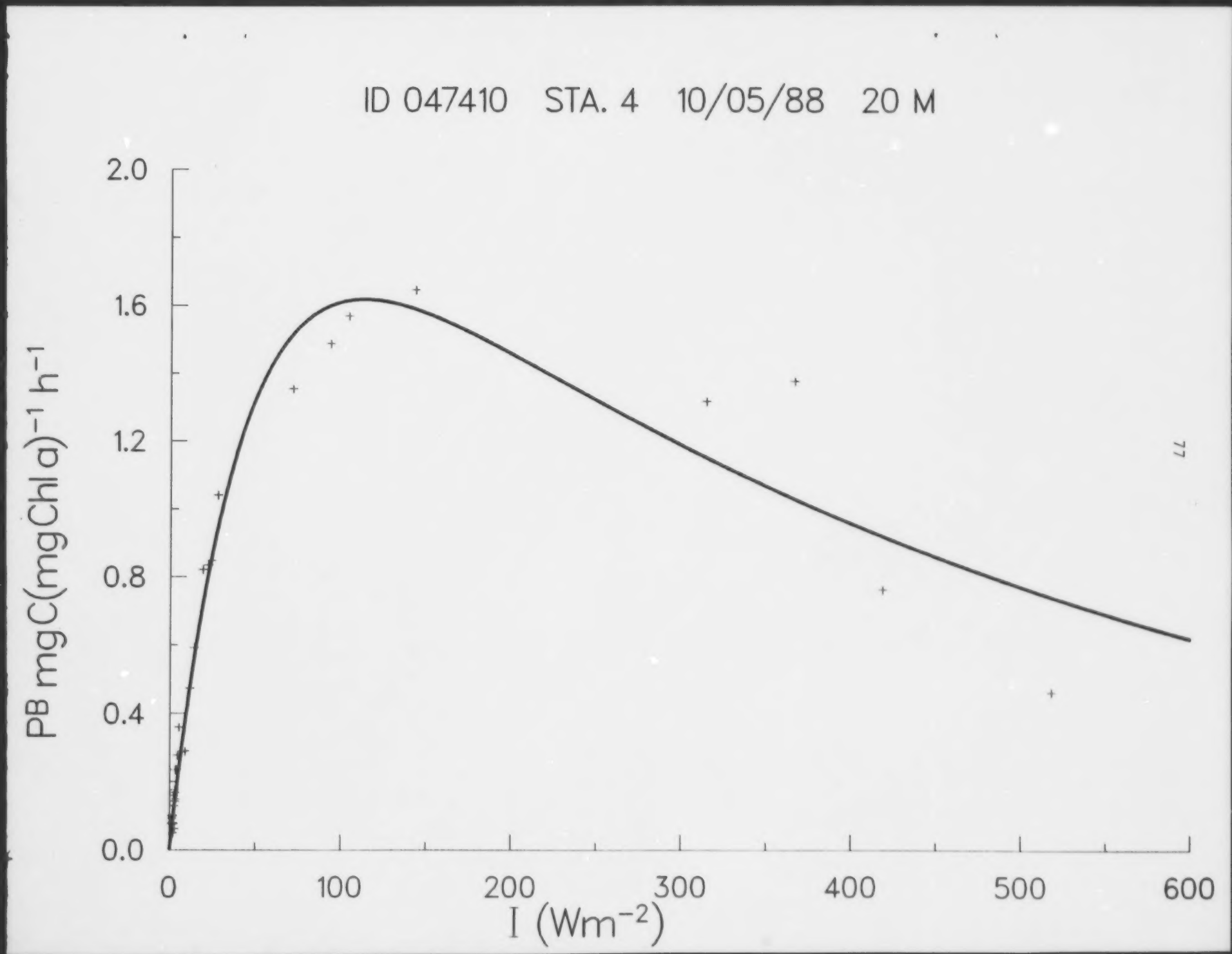

ID 047346 STA. 2 08/05/88 1 M
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
12

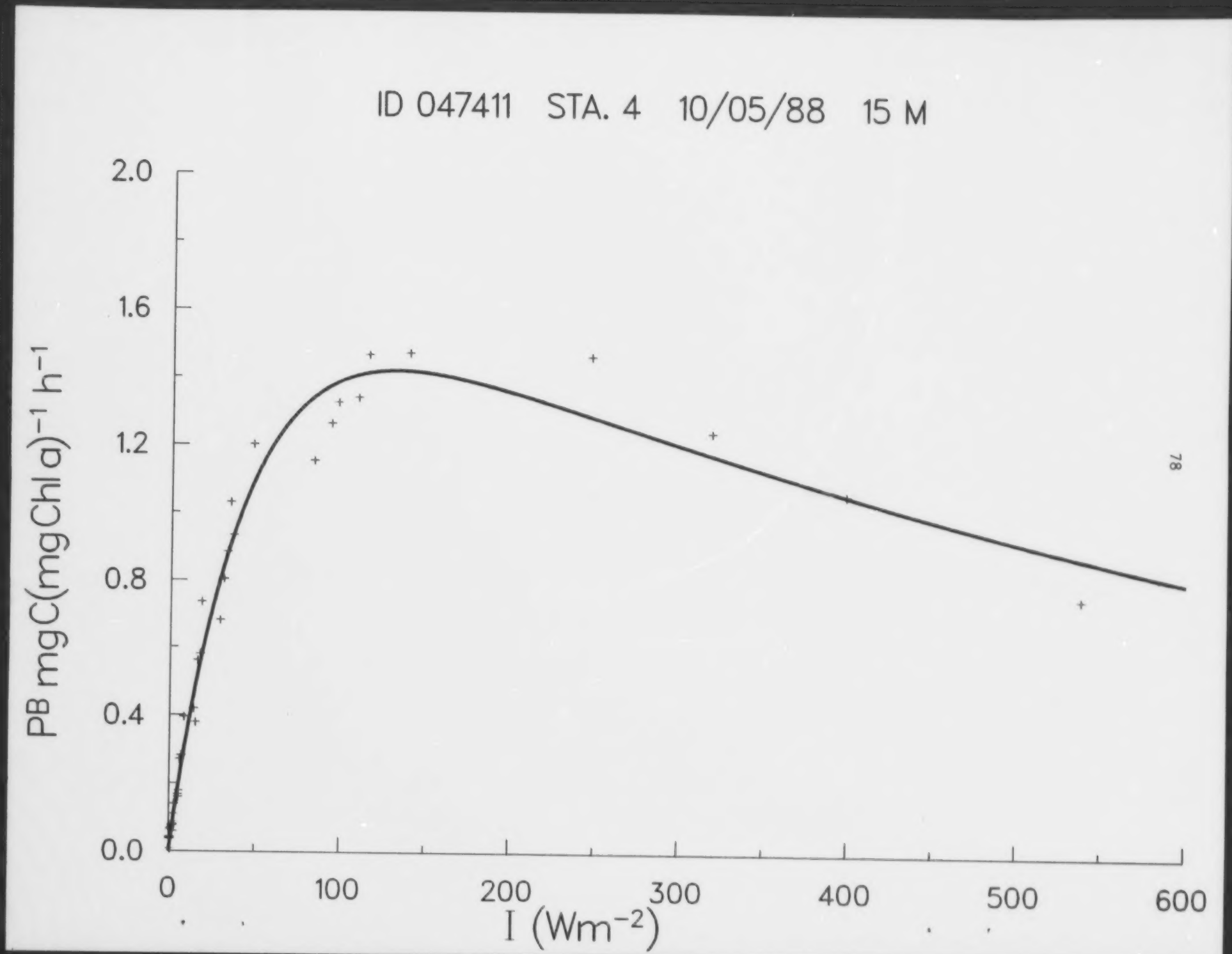

ID 047377 STA. 3 09/05/88 10 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
2.5
2.0
1.5
1.0
0.5
0.0
0
100
200
300
400
500
600
I (Wm^{-2})
73

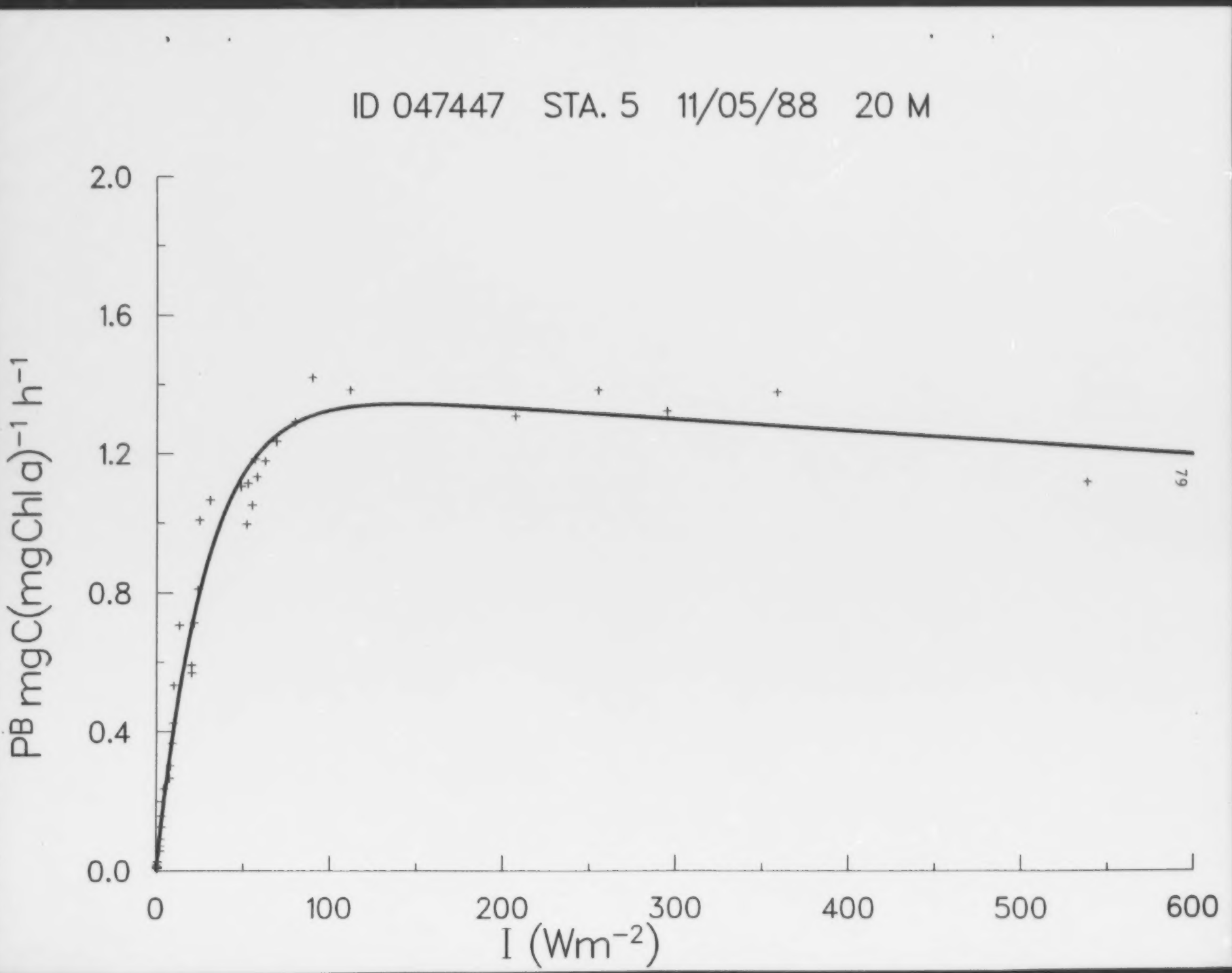

ID 047378 STA. 3 09/05/88 5 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
2.5
2.0
1.5
1.0
0.5
0.0
0
100
200
300
400
500
600
I (Wm^{-2})
74

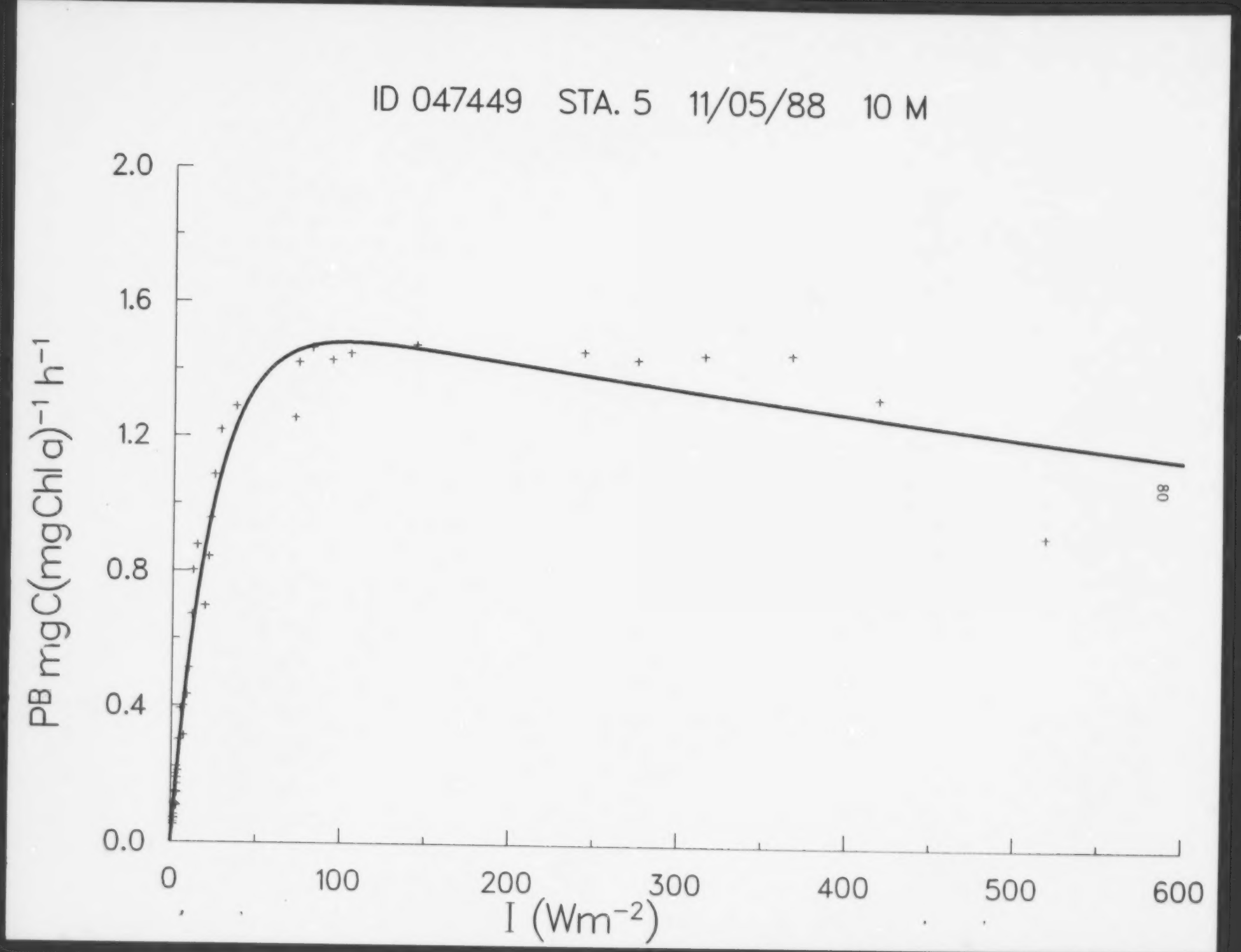

ID 047379 STA. 3 09/05/88 1 M
2.5
2.0
1.5
1.0
0.5
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
75

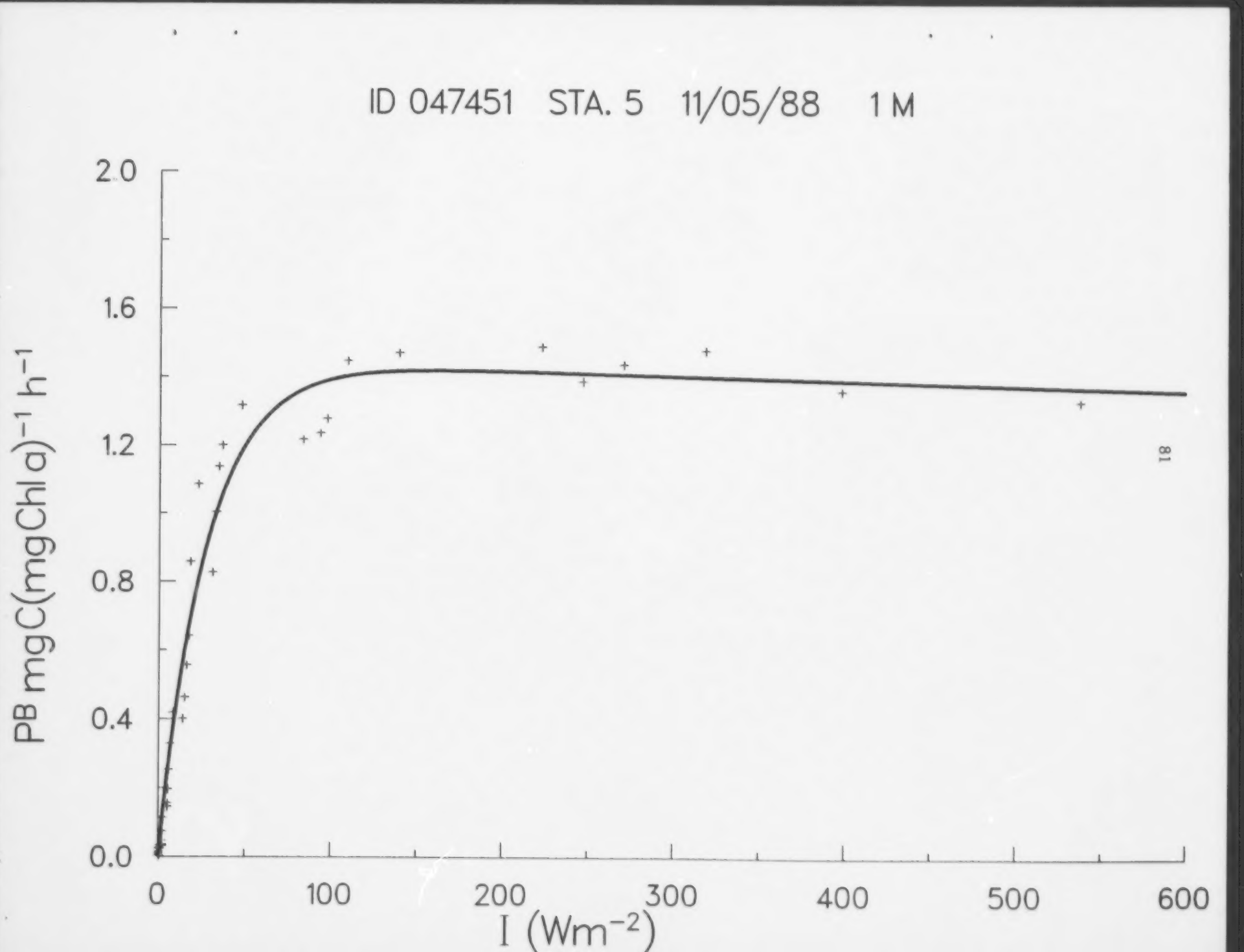

ID 047409 STA. 4 10/05/88 25 M
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
76

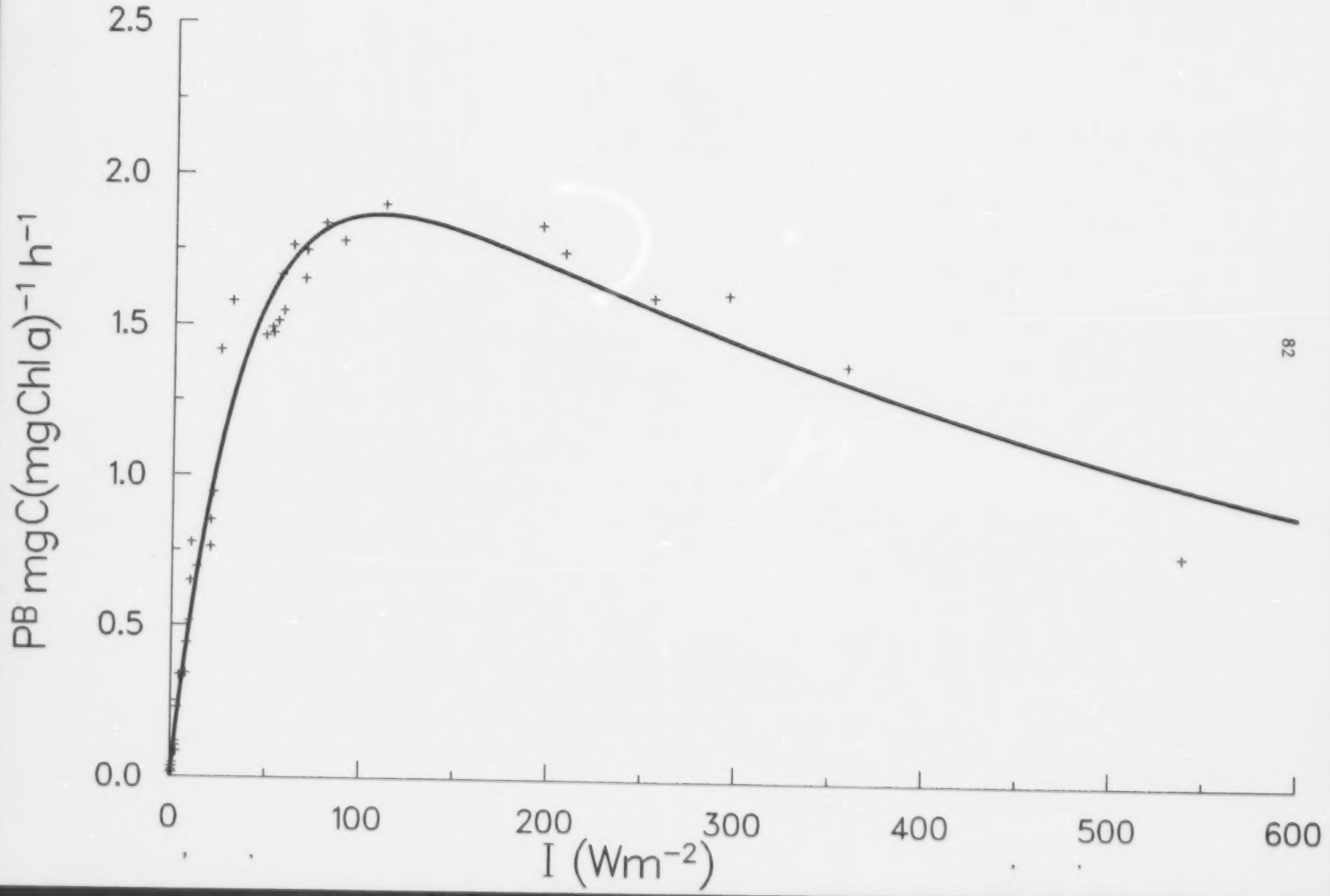

ID 047410 STA. 4 10/05/88 20 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
2.0
1.6
1.2
0.8
0.4
0.0
0
100
200
300
400
500
600
I (Wm^{-2})

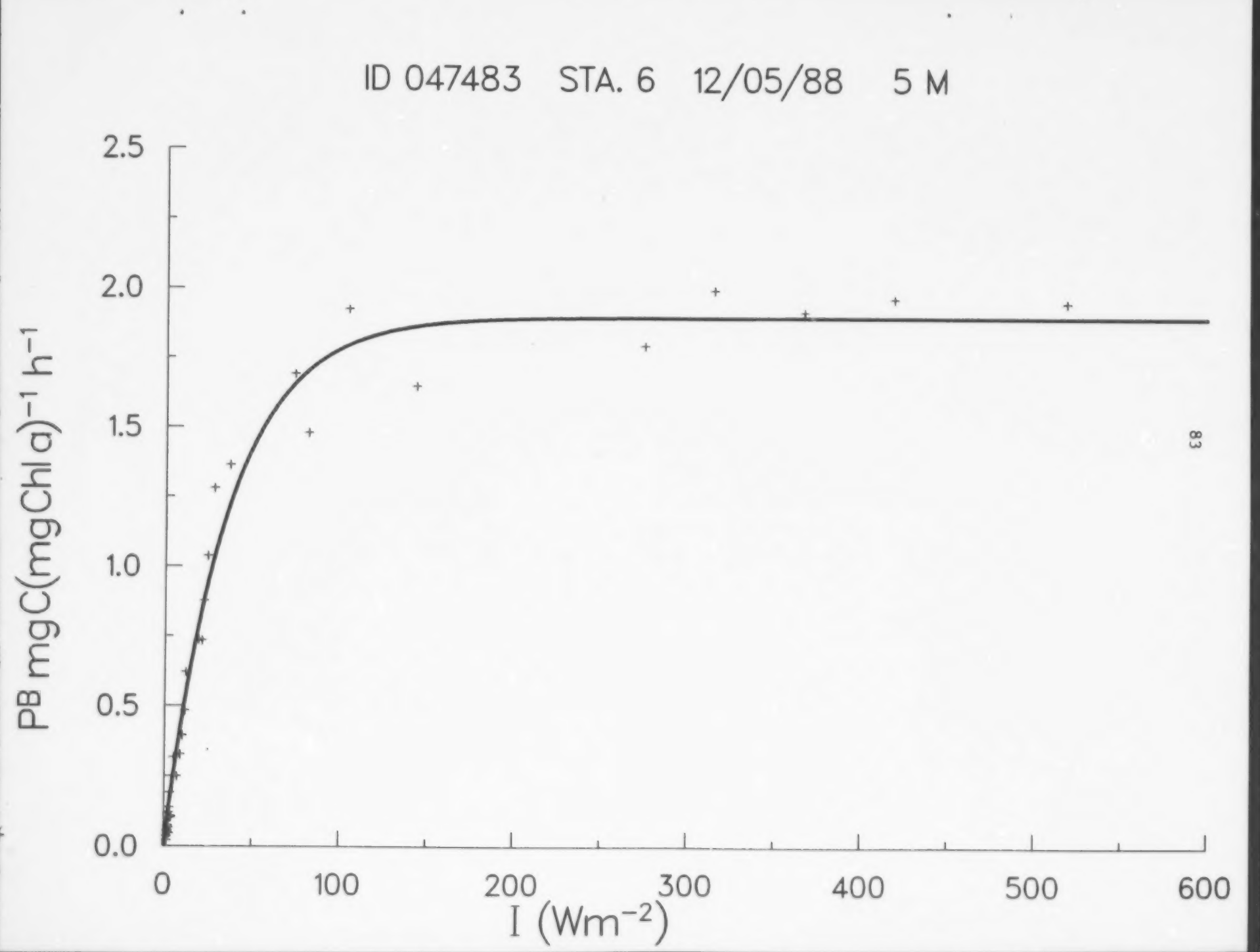

ID 047411 STA. 4 10/05/88 15 M
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
78

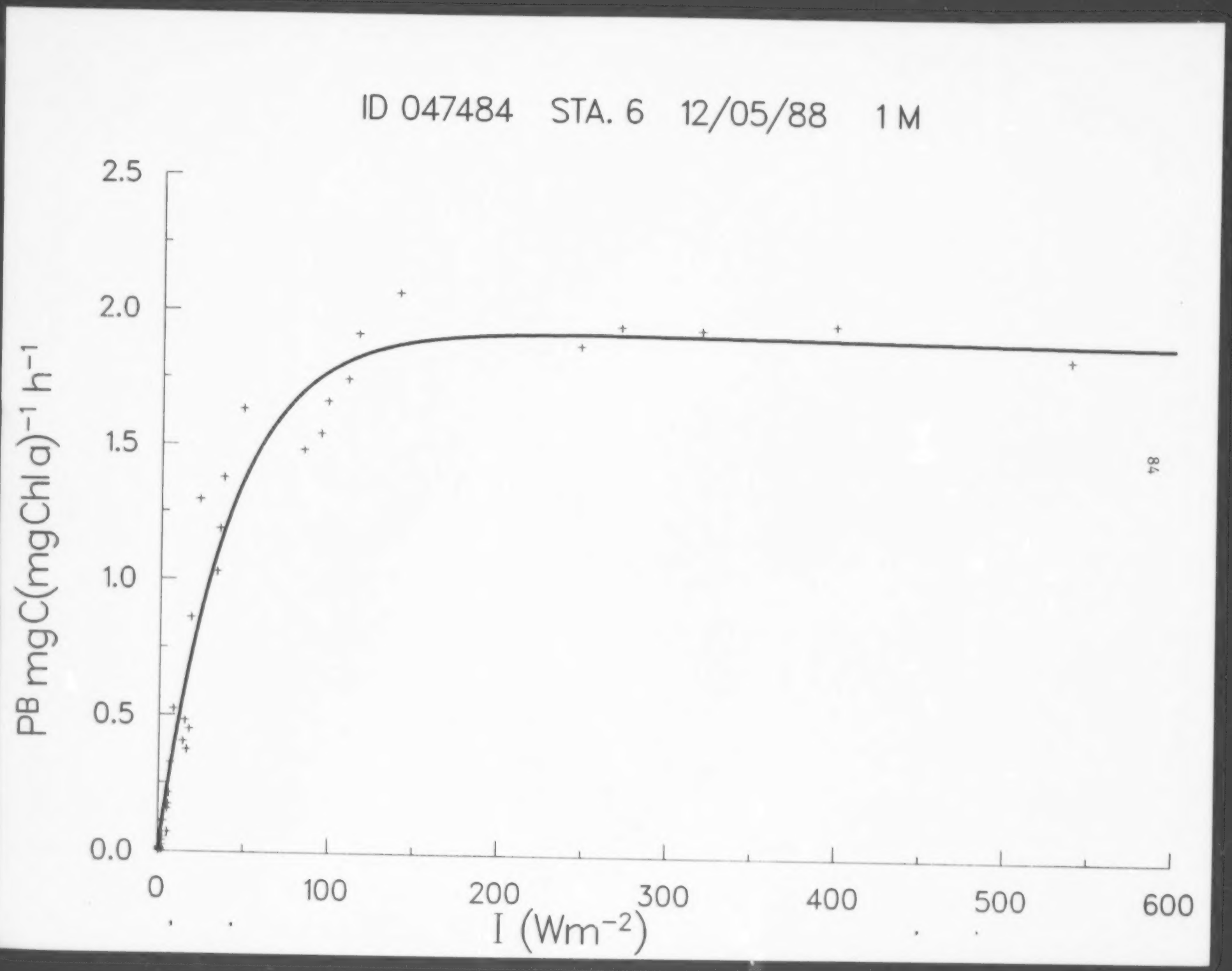

ID 047447 STA. 5 11/05/88 20 M
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
79

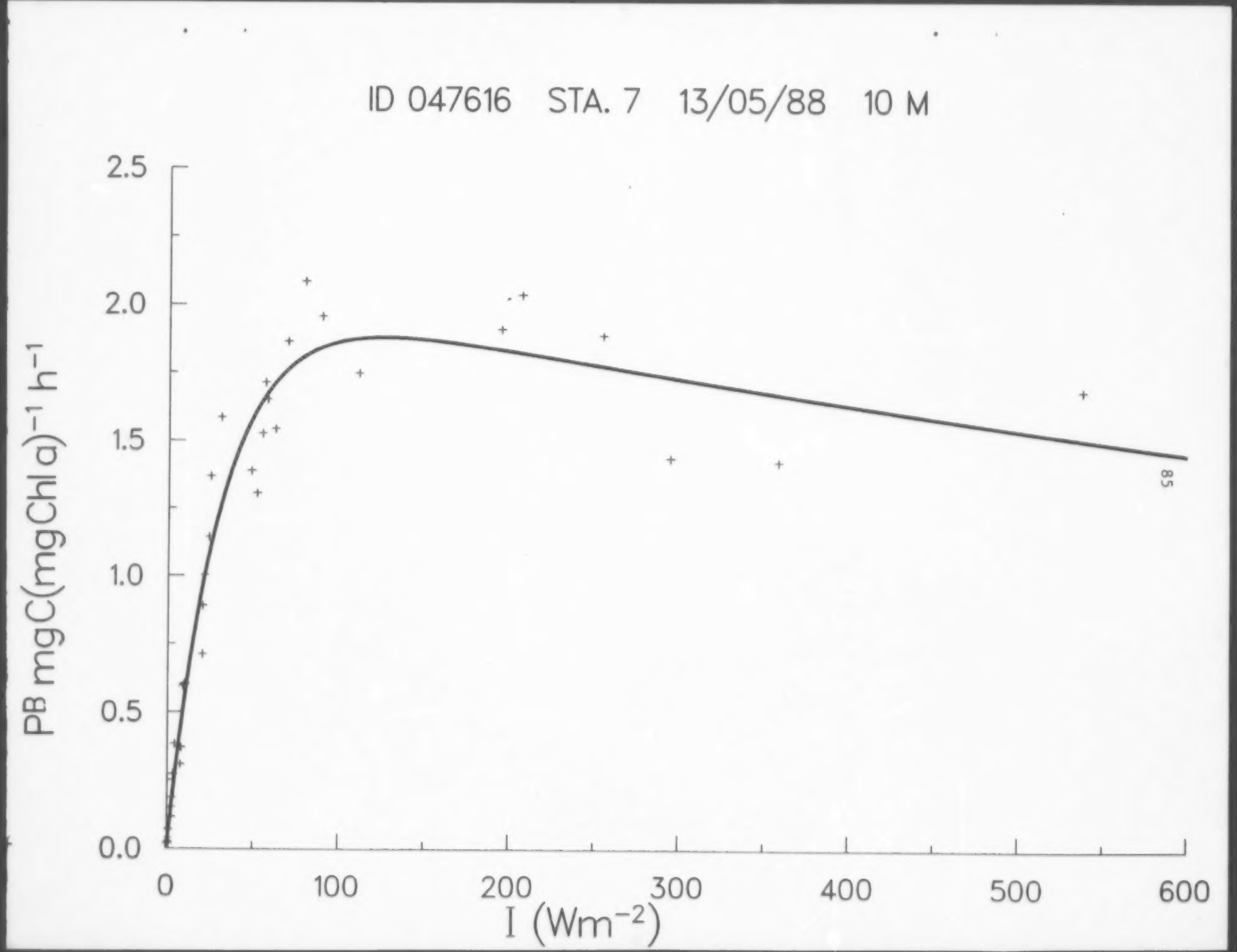

ID 047449 STA. 5 11/05/88 10 M
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
80

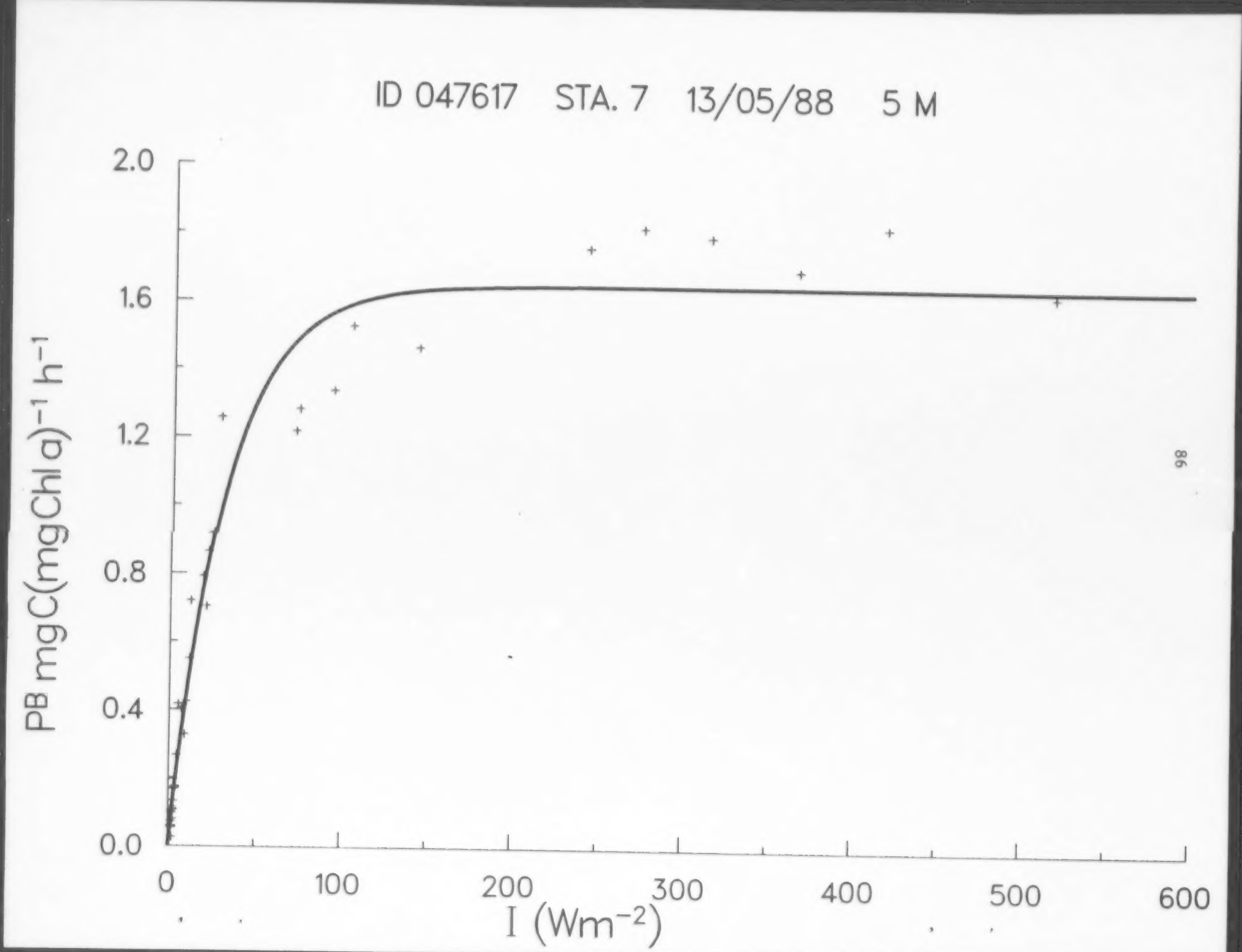

ID 047451 STA. 5 11/05/88 1 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
2.0
1.6
1.2
0.8
0.4
0.0
0
100
200
300
400
500
600
I (Wm^{-2})
81

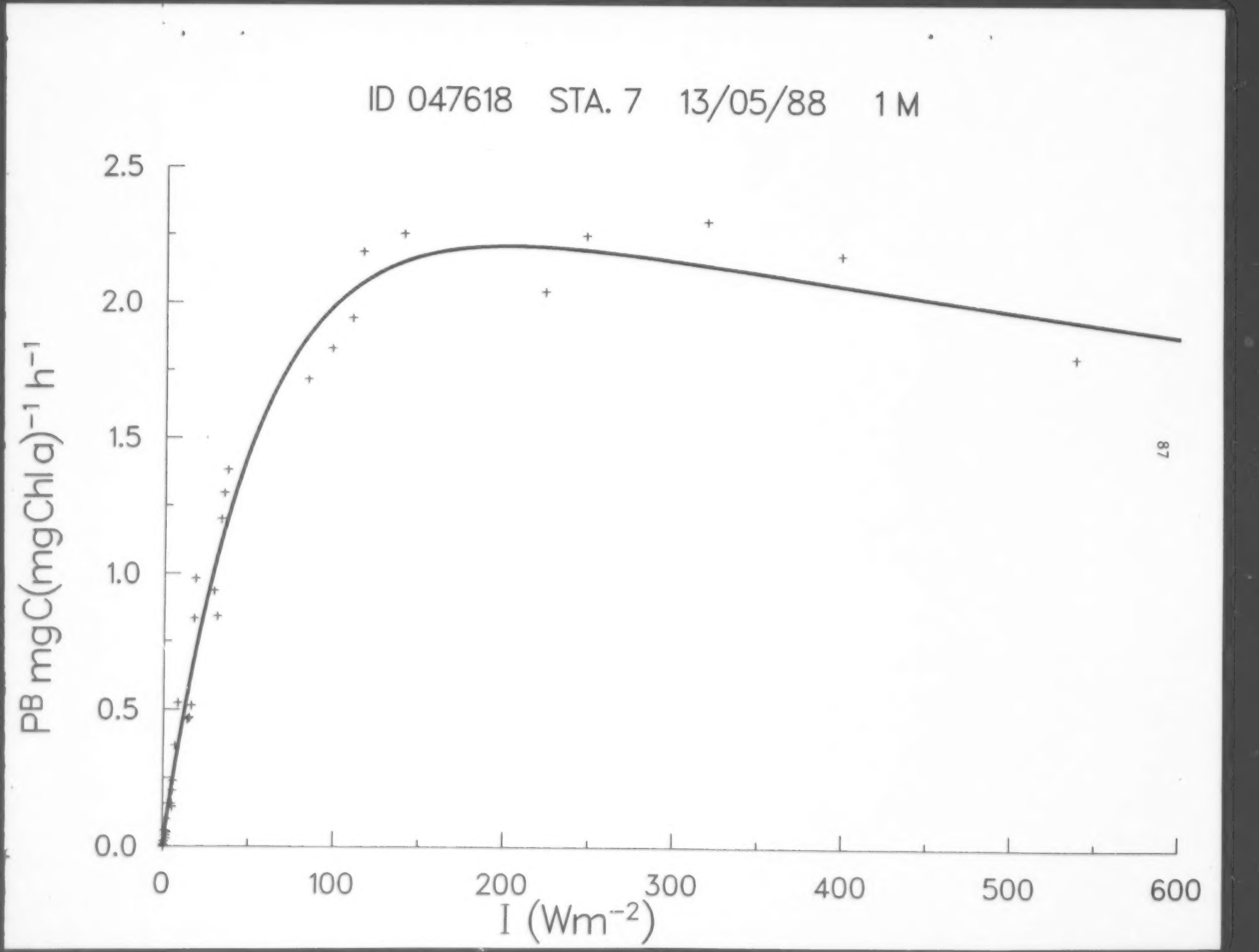

ID 047482 STA. 6 12/05/88 10 M
2.5
2.0
1.5
1.0
0.5
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
28

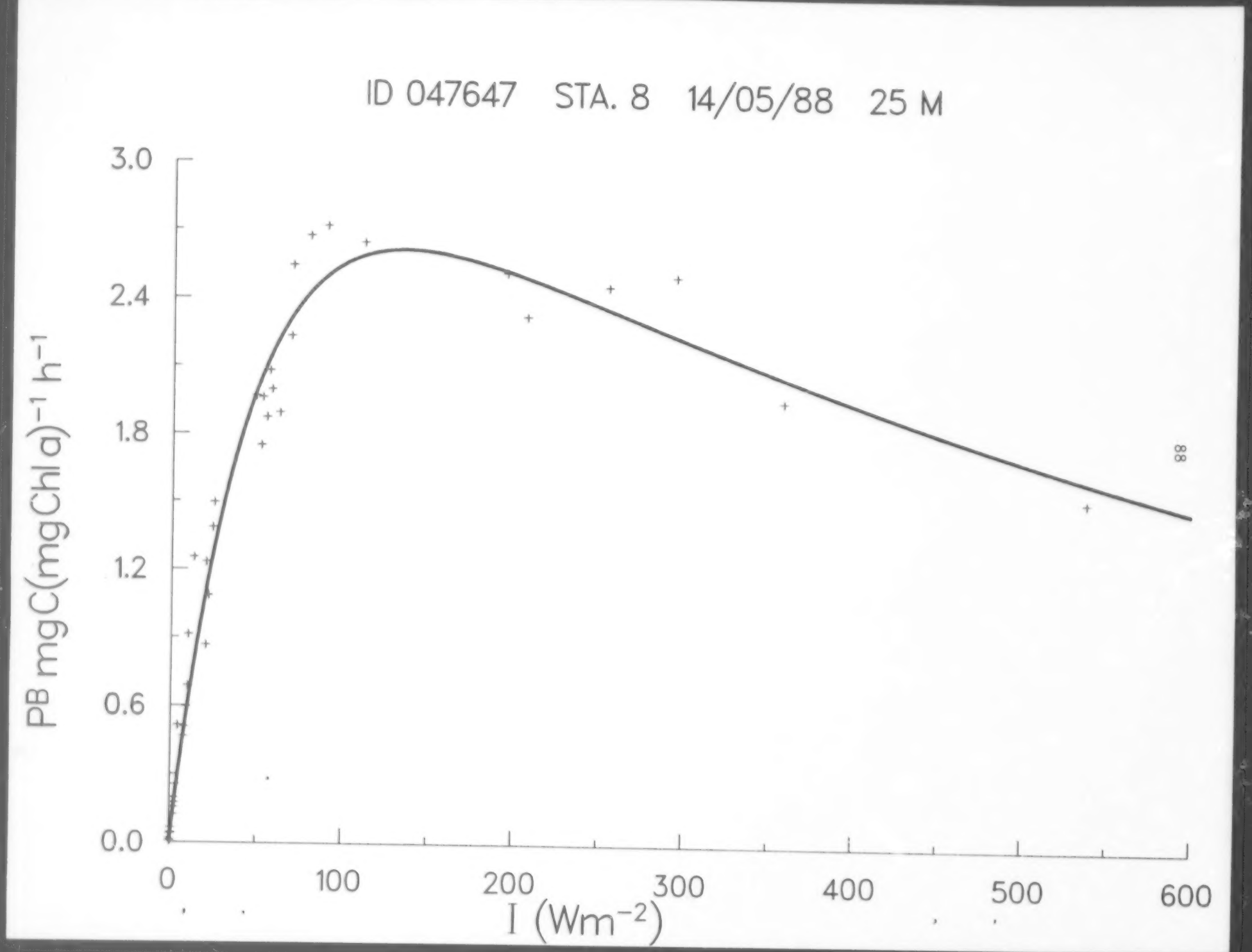

ID 047483 STA. 6 12/05/88 5 M
2.5
2.0
1.5
1.0
0.5
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
83

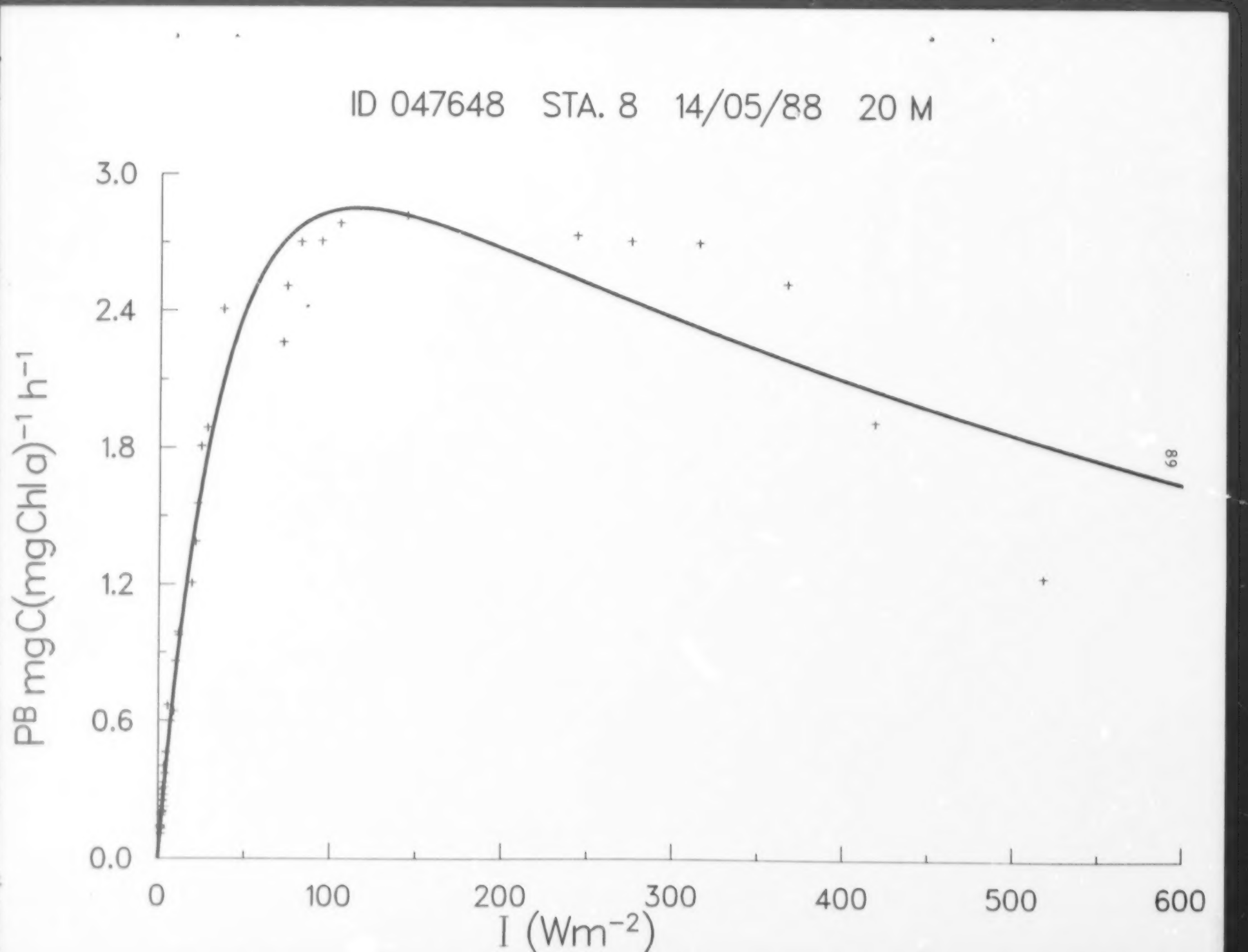

ID 047484 STA. 6 12/05/88 1 M
2.5
2.0
1.5
1.0
0.5
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
84

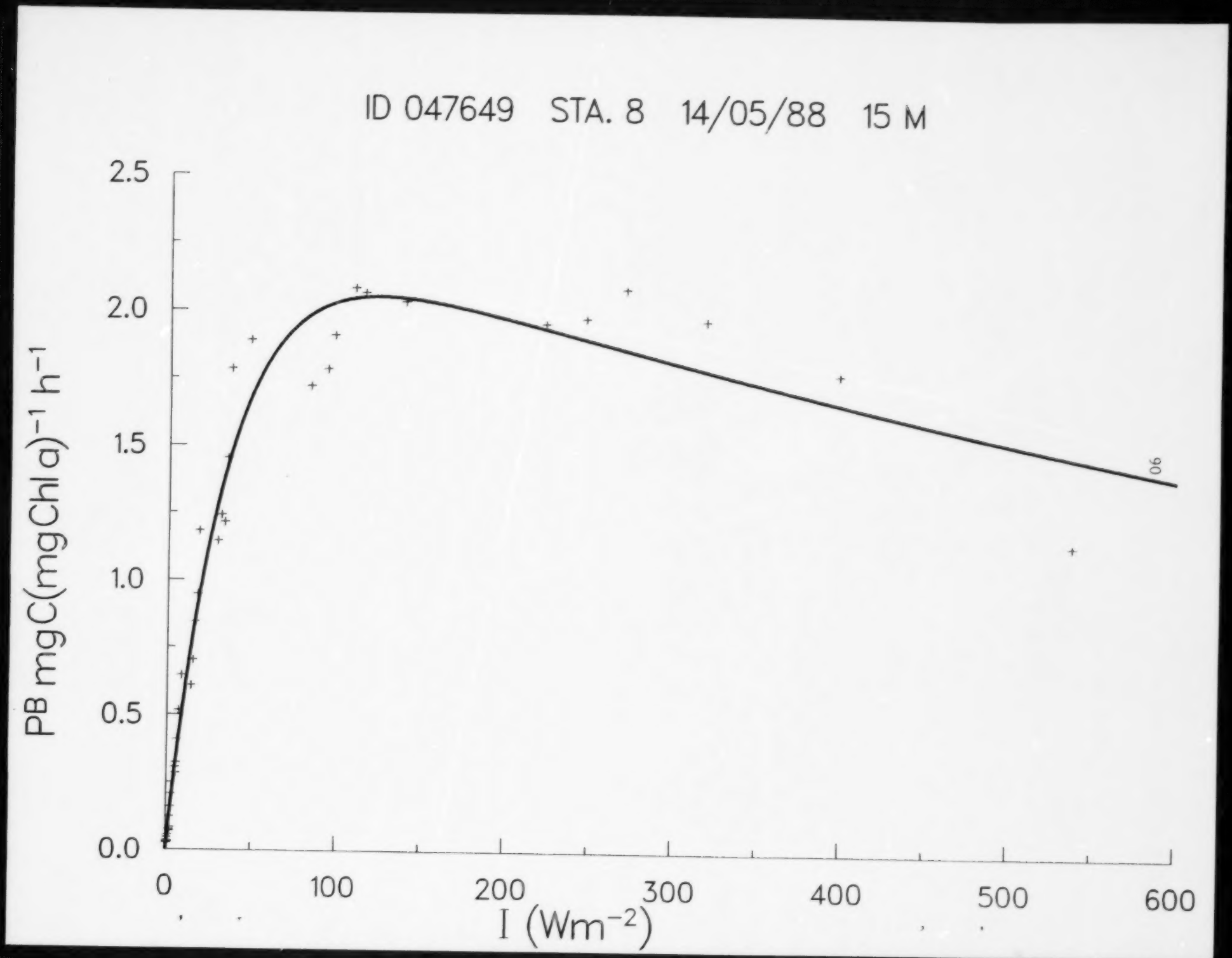

ID 047616 STA. 7 13/05/88 10 M
2.5
2.0
1.5
1.0
0.5
0.0
P^B mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
85

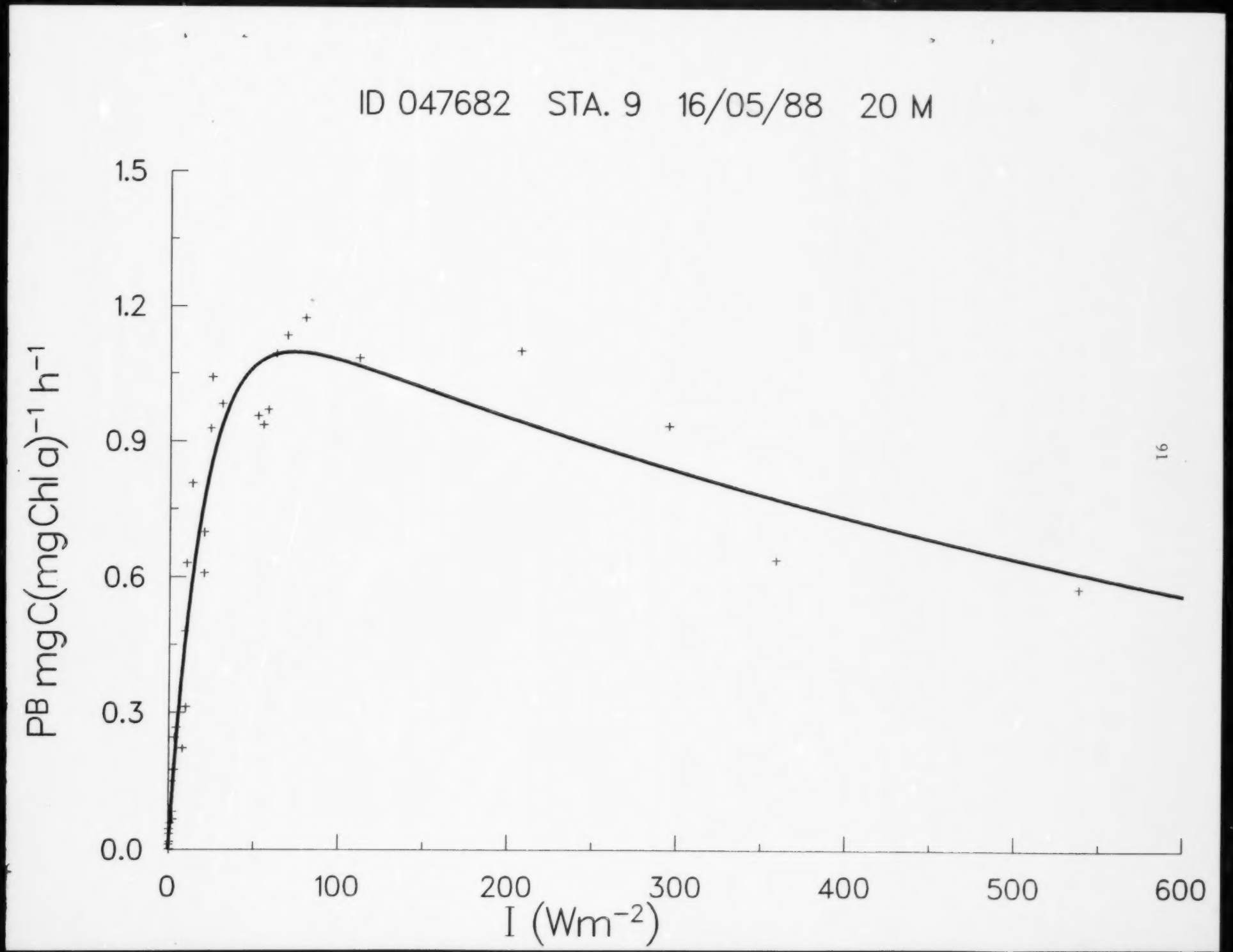

ID 047617 STA. 7 13/05/88 5 M
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
86

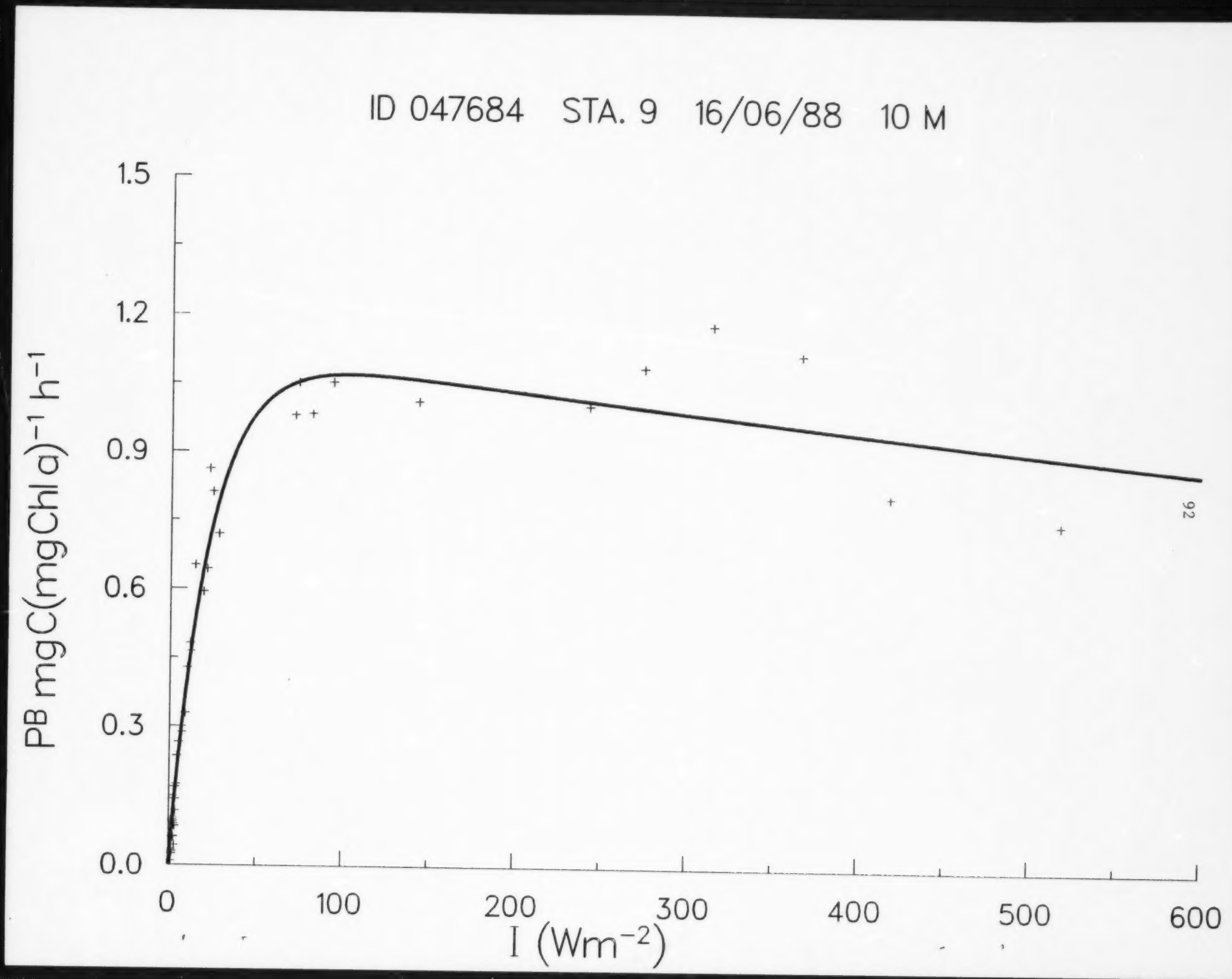

ID 047618 STA. 7 13/05/88 1 M
PB mgC(mgChl a)$^{-1}$ h^{-1}
2.5
2.0
1.5
1.0
0.5
0.0
0
100
200
300
400
500
600
I (Wm^{-2})
87

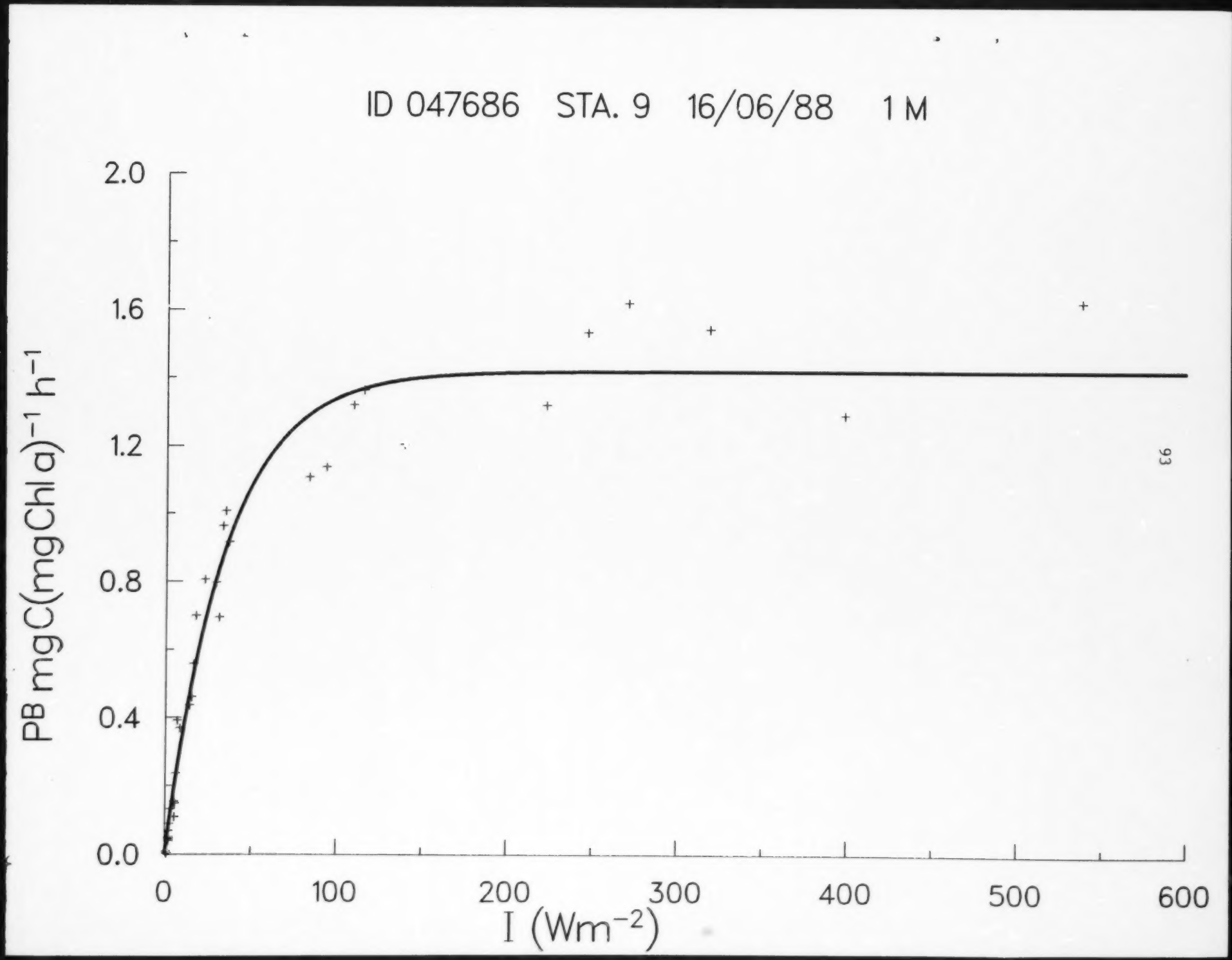

ID 047647 STA. 8 14/05/88 25 M
3.0
2.4
1.8
1.2
0.6
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
88

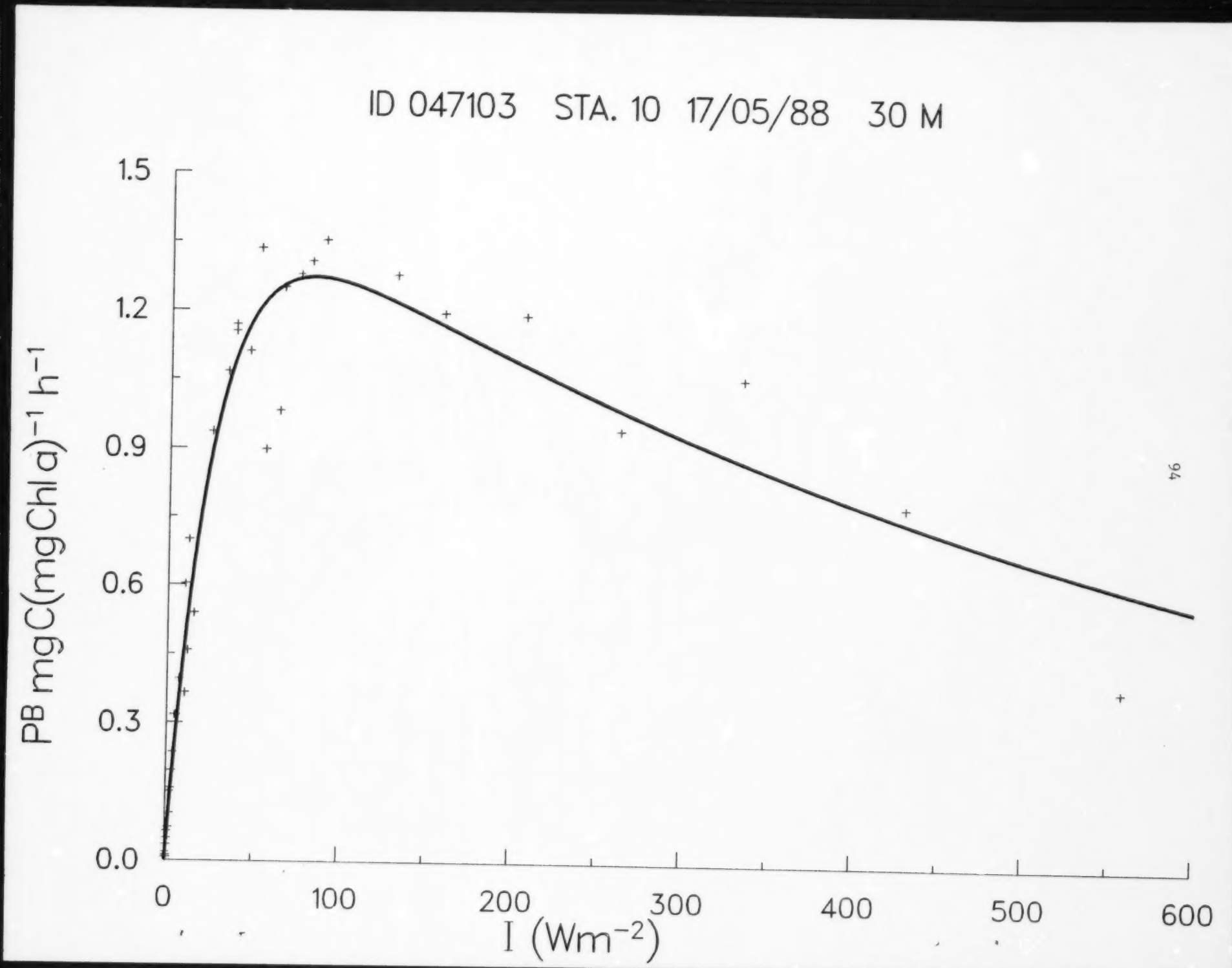

ID 047648 STA. 8 14/05/88 20 M
3.0
2.4
1.8
1.2
0.6
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
89

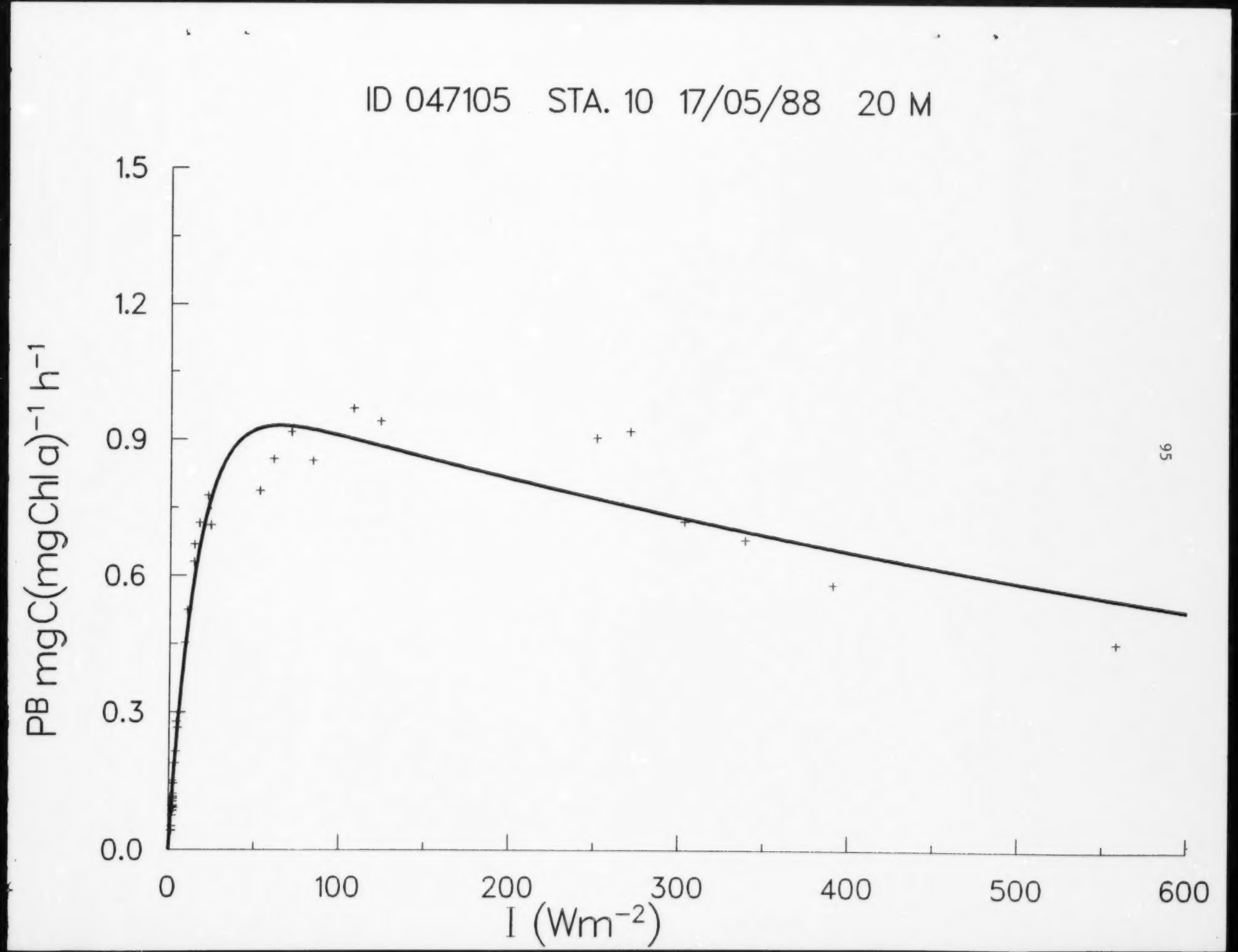

ID 047649 STA. 8 14/05/88 15 M
2.5
2.0
1.5
1.0
0.5
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
06

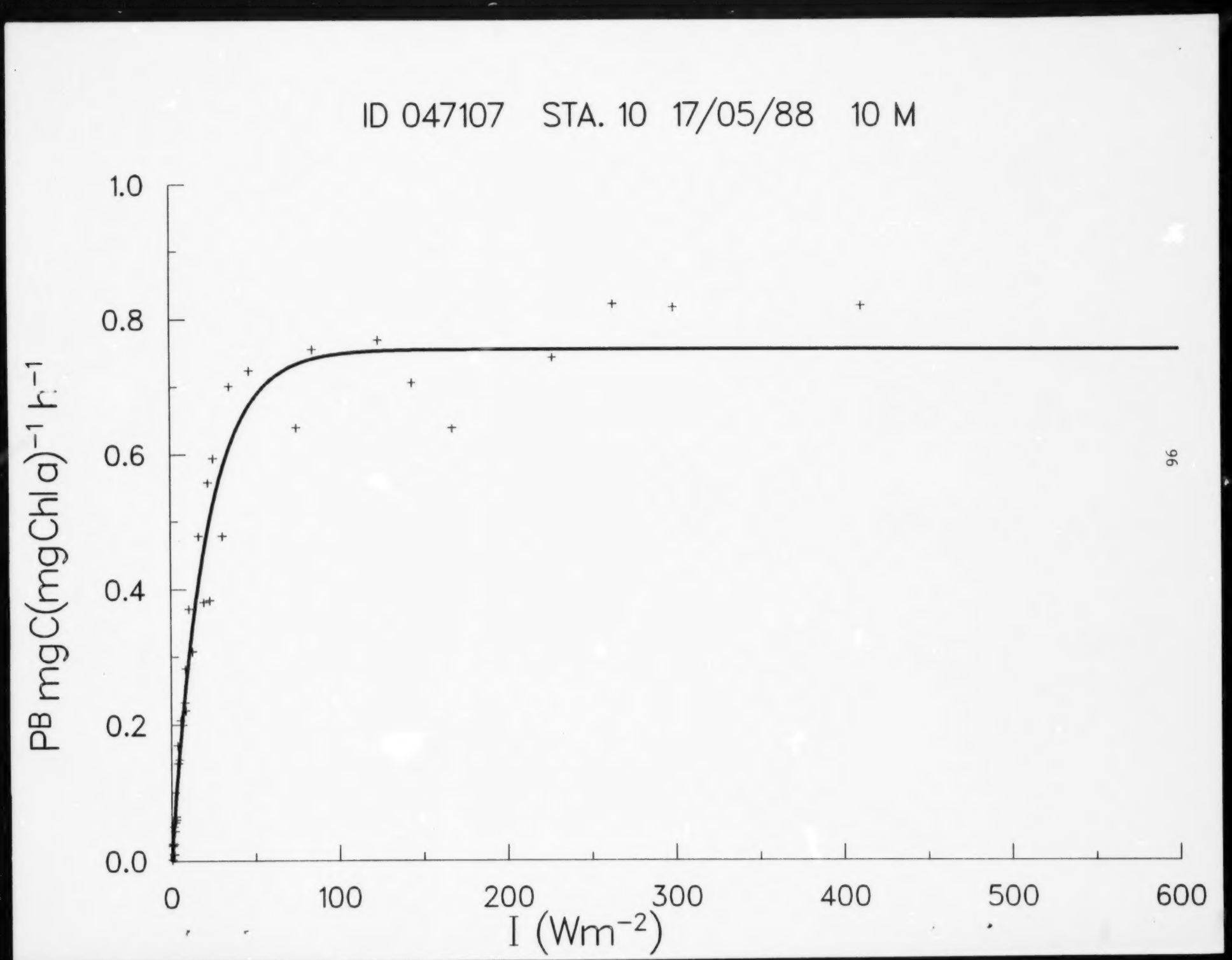

ID 047682 STA. 9 16/05/88 20 M
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
91


ID 047684 STA. 9 16/06/88 10 M
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
92


ID 047686 STA. 9 16/06/88 1 M
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
93


ID 047103 STA. 10 17/05/88 30 M
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})


ID 047105 STA. 10 17/05/88 20 M
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
95


ID 047107 STA. 10 17/05/88 10 M
1.0
0.8
0.6
0.4
0.2
0.0
PB mgC(mgChl a)$^{-1}$ h^{-1}
0
100
200
300
400
500
600
I (Wm^{-2})
96